ROCK PRODUCTS AND AGGREGATES

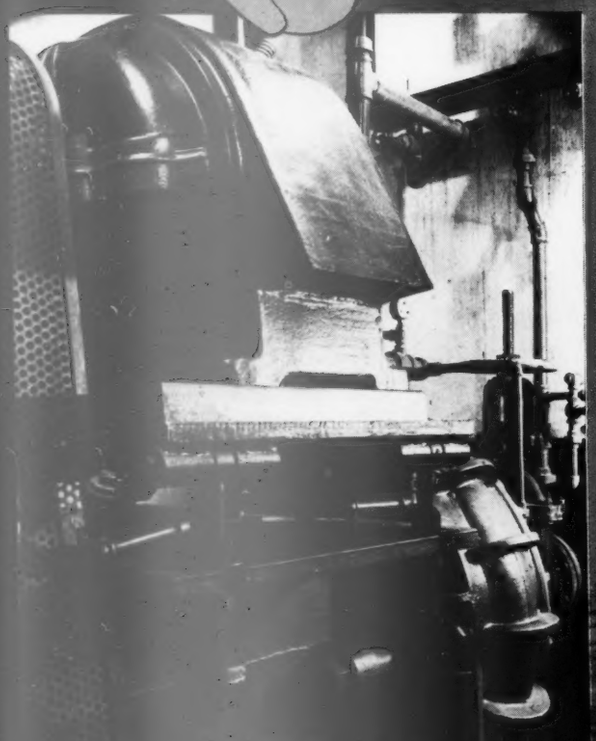
SEPTEMBER, 1938

Ford Motor Company,
Rouge Plant, Dealborn, Mich.
DATE 1936
ORDER NO.
QUANTITY
TYPE
DESCRIPTION
Nov. 24 C-116708 1 D-41 Hydroseal Pump
1937
Jan. 6 C-17849 1 D Hydroseal Pump
July 8 C-77467 2 B-3-1 Hydroseal Pumps
" 31 C-77552 2 B-3-1 Hydroseal Pumps
Aug. 8 C-87558 2 A-1-1 Hydroseal Pumps
Sept. 3 C-97678 2 B-3-1 Hydroseal Pumps
Oct. 26 C-107891 2 D-3 Hydroseal Pumps

REPEAT ORDERS

SAND PUMPS *in* GLASS PLANT

12 HYDROSEAL PUMPS ordered in less than one year (six repeat orders) for the Glass Manufacturing Dept. of the Rouge Plant of Ford Motor Co., which is the "largest single industrial development in the world". . . . These Maximix Rubber Lined Pumps handle various grades of sand used for polishing the safety plate glass of the Ford and Lincoln Automobiles. . . . Reliability and Economy are obviously essential characteristics of all equipment which has any part in a high speed production schedule. Send for the new, revised, enlarged Hydroseal Pump Catalog No. 937, covering our complete line of Sand, Slurry and Dredge Pumps.



HYDROSEAL MAXIMIX RUBBER PROTECTED SAND–SLURRY–DREDGE PUMPS

HYDROSEAL AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD AND CAN BE PURCHASED ONLY THROUGH THESE COMPANIES

U. S. A.: THE ALLEN-SHERMAN-HOFF CO. 223 S. 15th St., Philadelphia, Pa.
CANADA: ALLEN-SHERMAN-HOFF, LTD. 602 Colonial Bldg., 11 King St., West, Toronto, Ont.
ENGLAND: THE ASH CO. (LONDON), LTD. 79/80 Petty France, Westminster, S.W. 1, London
PHILIPPINE ISLANDS: ATKINS, KROLL & CO., INC. Insular Life Bldg., Manila
SOUTH AFRICA: THE DENVER MACHINERY CO., LTD., 206 Commissioner St., Johannesburg
AUSTRALIA: CROSSLE & DUFF PTY., LTD., 360 Collins Street, Melbourne

Rochester Public Library
SEP 6 1938

THE
LINK-BELT
Rotoscoop

Recovers Fine Sand Formerly Lost in Overflow Water

The Link-Belt Rotoscoop provides a simple method of recovering fine grains formerly lost in the overflow water—discharging dry enough for truck transportation.

The volume of fines and grading can be easily varied to suit requirements.

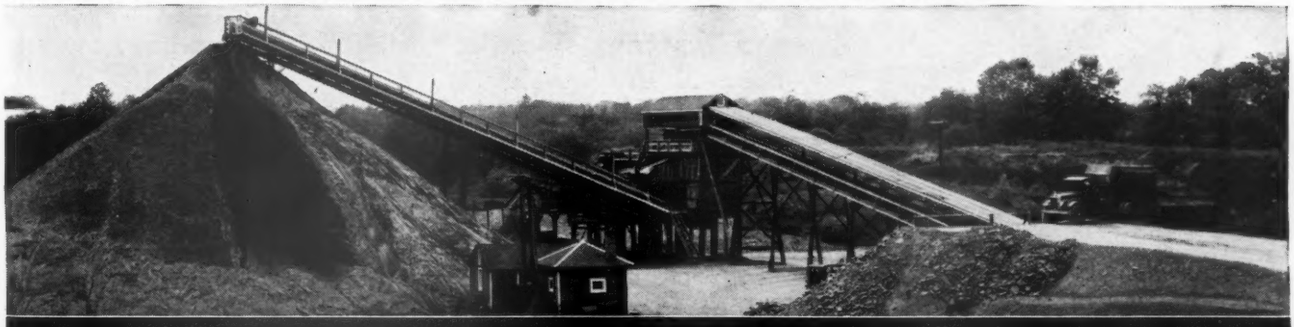
The Rotoscoop is a self-contained unit requiring low headroom, and minimum space and foundations; also little power. Can be fitted-in to take the overflow from present sand units, or to replace them. It is made in 4 sizes: 6, 9, 12 and 15 ft. diameters with capacities ranging from 20 to 150 t.p.h., based on material weighing 100 lbs. per cu. ft. Send for Folder No. 1463.

SAVES $1000.00 ANNUALLY

"On the basis of our several years' experience with dewatering wash boxes, we are actually saving $1000.00 per year in maintenance by using the rotoscoop. It is efficiently producing a satisfactory product in the most economical way."—J. E. Montgomery, Mt. Dennis, Ontario.

7480

BELOW: General view of J. E. Montgomery Sand & Gravel Plant. Employs Link-Belt Anti-Friction Belt Conveyors and 15′ dia. Dewatering Rotoscoop (upper illustration) for reclaiming and dewatering the sand grains in the overflow water. Foreground shows 25,000 cu. yd. pile of sand recovered by the Rotoscoop.

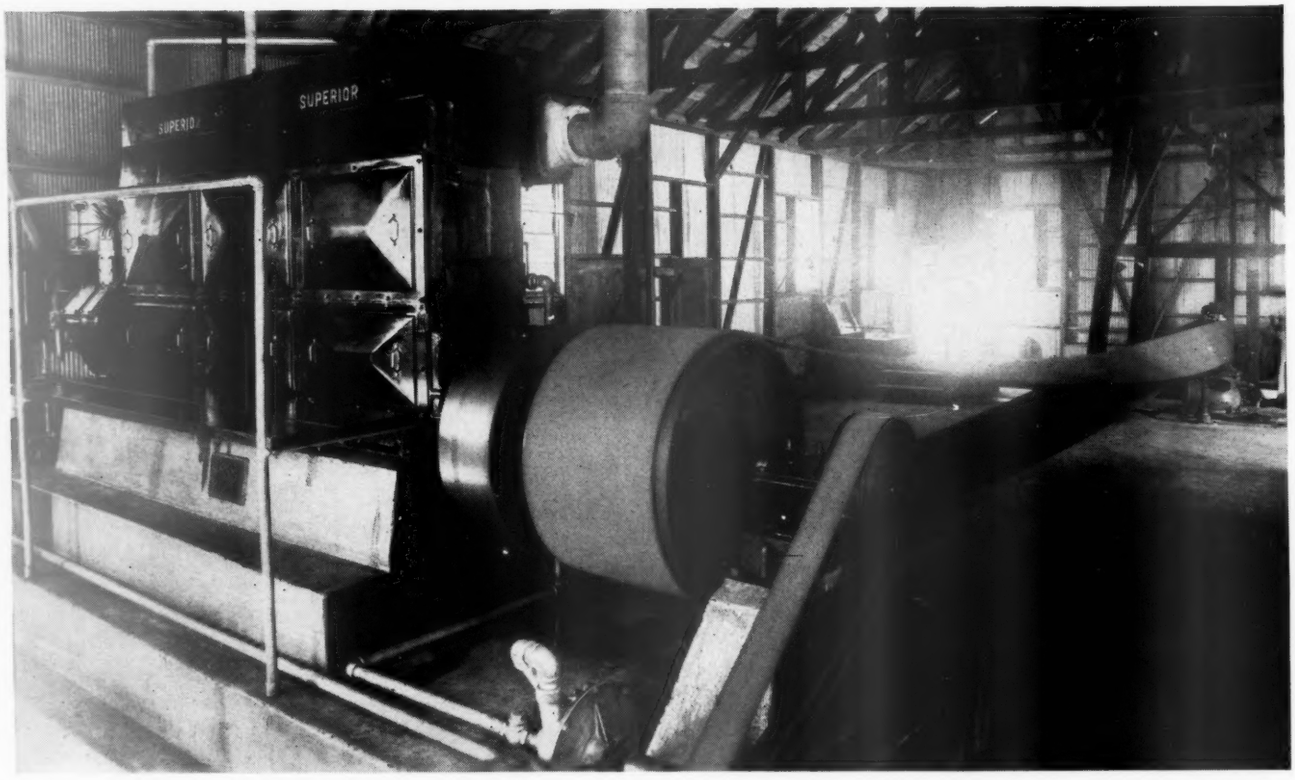


LINK-BELT
Equipment for Handling Sand, Gravel, Stone

PIT AND QUARRY, September, 1938. Vol. 31, No. 3. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter February 28, 1932, at the Post-Office at Chicago, Ill., under the act of March 3, 1897.

FLOODED MINES...

....earn no profit!



The Klondike Fluorspar Corporation, Smithland, Kentucky, maintains a dry mine with a 260 H. P. Superior Diesel belted to a turbine type pump.

Cheap, dependable power from Superior Diesels makes many operations profitable, no matter how remote the location.

Generally a couple of dollars worth of fuel per day supplies power that would cost ten dollars or more any other way—and there are so many ways to use these engines. Belt them to pumps, to rock crushers, or air compressors. Connect them to generators. And remember that a combination of several drives can be taken from a single, sturdy Superior Diesel. Let us show you how and tell you what it would save.

THE NATIONAL SUPPLY COMPANY . . . SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. · SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y; Los Angeles, Calif.; Houston, Texas.

Here's the story

and here's the crusher

STRONGEST ROCK CRUSHER SHIPPED TO ENGLAND

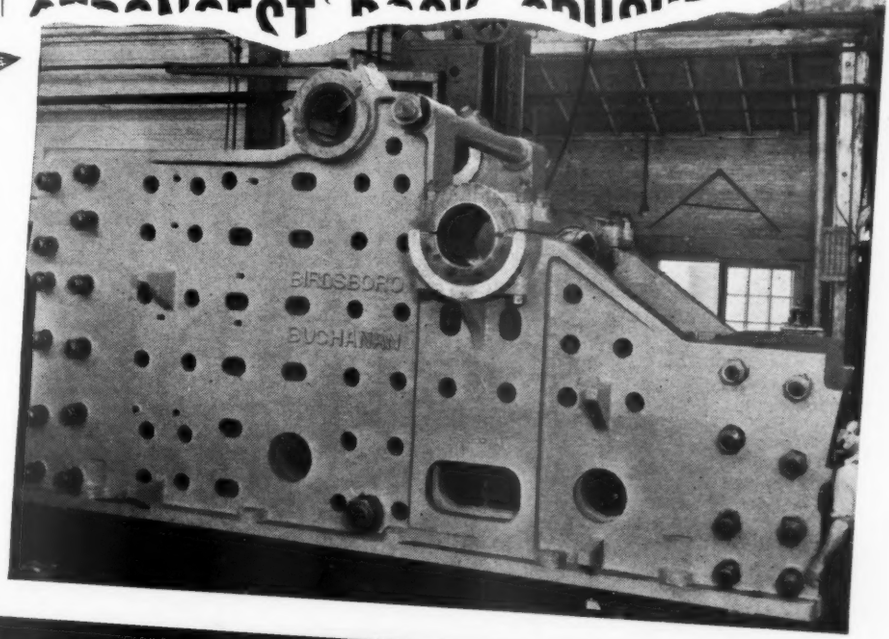
Machine to Withstand Enormous Pressures

Reading, Pa., July 22. — At 11 o'clock this morning, what is believed to be the strongest rock crusher ever built, started on its long journey from the plants of the Birdsboro Steel Foundry and Machine Company, to a mountain-top quarry near the town of Penmaenmawr, Wales, England.

Birdsboro officials stated that the machine will break up 10-ton chunks of granite into 10-inch "pebbles" in approximately one minute. The granite will then be used in the manufacture of cobblestones to pave Welsh roads. From five to six hundred tons of granite an hour can be crushed by the machine.

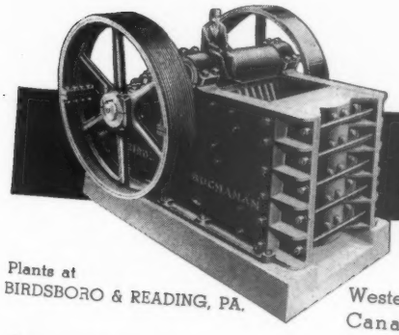
Operating like a huge mouth the machine bites down on the granite boulders with a force of nearly 13 tons, chews a while and then swallows them. However, because of peculiar conditions at the Welsh quarry this crusher was designed to withstand pressures nearly four times as great — fifty tons. This figure is almost twice as large as standard crusher strengths and is believed to make this machine the strongest ever built. The frame of the machine eloquently displays its unusual strength. Made in four keyed sections, it weighs with the flywheels a total of 151 tons. The heaviest piece tipping the scales at 30 tons.

When the crusher is unloaded in Wales, engineers plan to run a cable from the top of the mountain and slide these parts on skids to get them up the mountain. According to a Birdsboro spokesman the Birdsboro-Buchanan crushers are the only ones made which can be transported in this fashion: To this ability he attributed much of Birdsboro's success in gaining foreign orders such as this.



This picture shows the Special 56" x 72" Birdsboro-Buchanan Type C all-steel crusher being disassembled for shipment to Wales, England. The frame shown is designed 100% stronger than our regular design for this size and is, as far as we know, the strongest crusher frame ever built. It weighs 151 tons with flywheels (not shown).

For unusual requirements such as this — for easier transportation in difficult locations — for rugged strength — specify Birdsboro-Buchanan Crushers.



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Plants at
BIRDSBORO & READING, PA.

A Division of: **BIRDSBORO STEEL FOUNDRY AND MACHINE CO.**
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Tough Rope for Tough Jobs

"Flex-Set" Preformed Yellow Strand is especially recommended for hoist line, crowd rope, rack rope and swinging lines on power shovels; for dragline and hoist line on dragline machines; for holding line and closing line on clam shell buckets.

Almost any wire rope will serve well enough in some places — but where the going is rough — *and tough,* there "Flex-Set" Preformed Yellow Strand shows its super-quality — its unquestioned ability to *"take it,"* and *"like it."*

This is the same Yellow Strand that has been "taking it" successfully for many years — the same specially drawn wire, tested and selected — the same careful manufacture by the same company that is now *62 years young.*

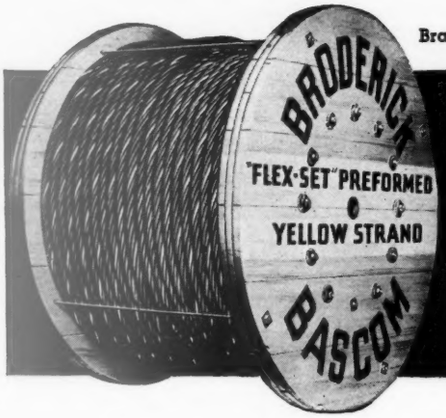
The difference results from preforming, which sets the strands to the helical form they maintain permanently in the finished rope. Thus "Flex-Set" Preformed Yellow Strand is largely pre-broken in. It is limp—easy to handle and install—highly resistant to kinking, fatigue and wear.

With these properties, how could it be other than economical? Try it!

BRODERICK & BASCOM ROPE CO., St. Louis

Branches: New York, Chicago, Seattle, Portland, Houston; Factories: St. Louis, Seattle, Peoria

U-y



"Flex-Set" Preformed YELLOW STRAND

Mack sells Colonial Sand and Stone Company, Inc., of New York City

50 new Mack Trucks powered by *Cummins Diesels*

for New York City operation where the average daily runs are only 35 miles.

Colonial purchased 62 additional Cummins Diesels to replace their old gasoline engines. They now own a total of . . . 112

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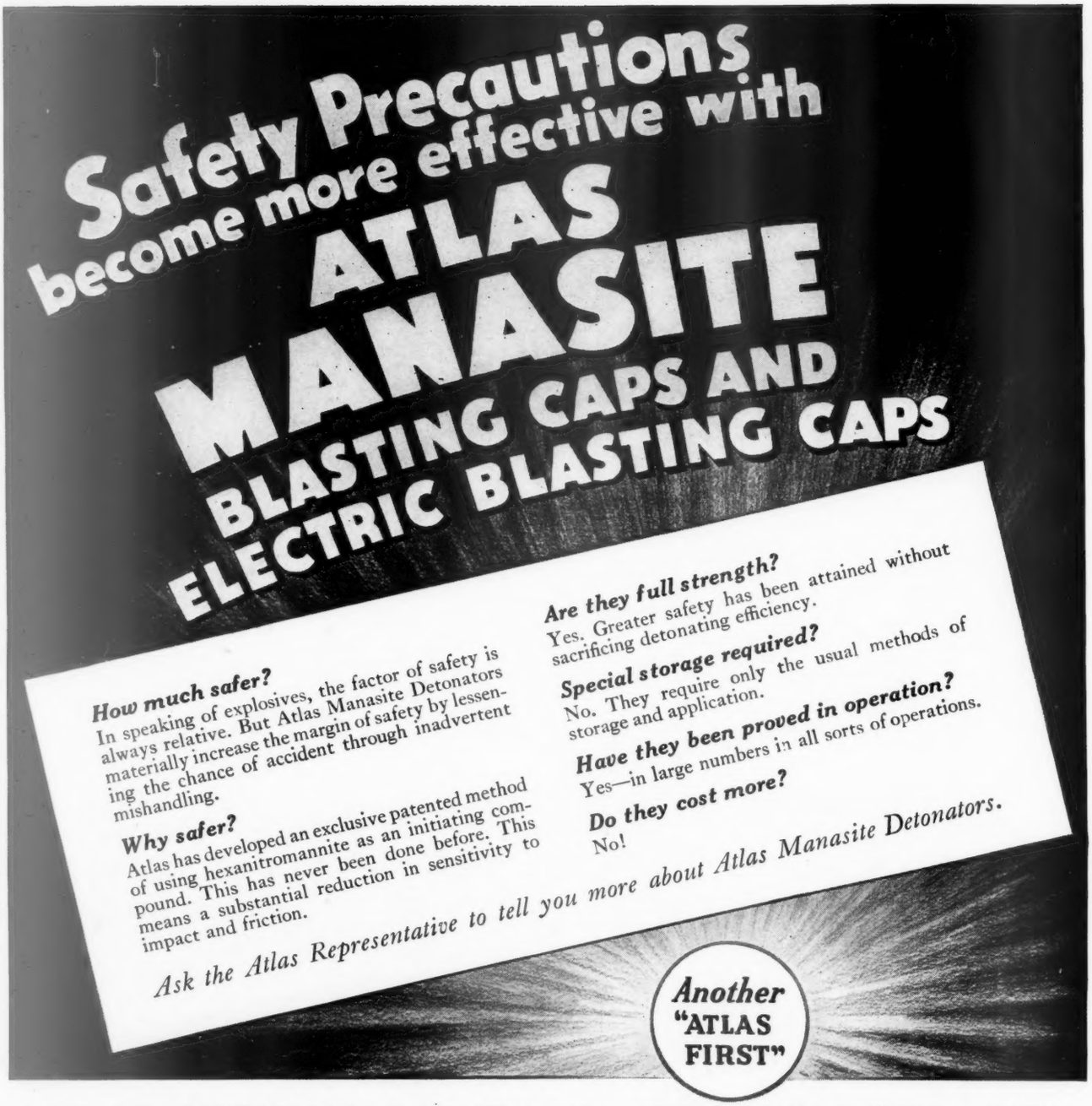
CUMMINS DIESEL

PIONEER IN MODERN DIESEL DEVELOPMENT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How much safer?
In speaking of explosives, the factor of safety is always relative. But Atlas Manasite Detonators materially increase the margin of safety by lessening the chance of accident through inadvertent mishandling.
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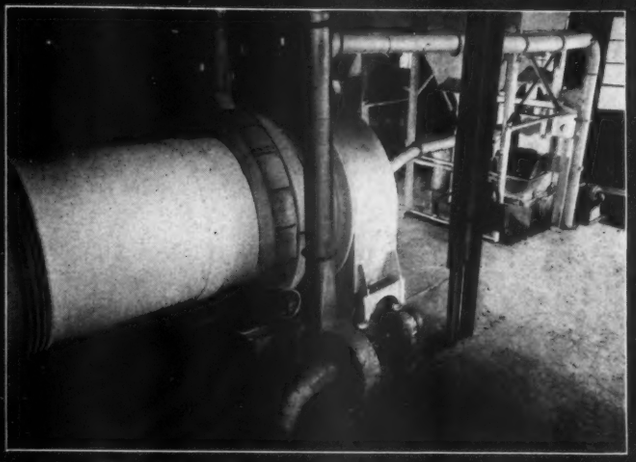
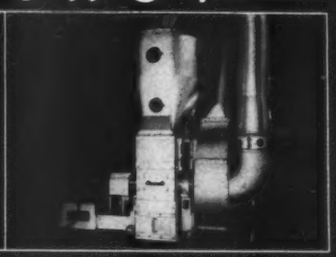


CLOSE-UP — OR LONG-SHOT



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QUAKER offers a *Complete Coverage* of Mechanical Rubber Goods

Quaker operates at Philadelphia a rubber manufacturing plant that turns out a diversified line of Quality products. Here is one of the largest stocks of Mechanical Rubber Goods to be found anywhere, available for instant shipment. Large warehouse stocks at Chicago and San Francisco. In addition, Quaker products are stocked by leading distributors in all the industrial centers.

FOR THE
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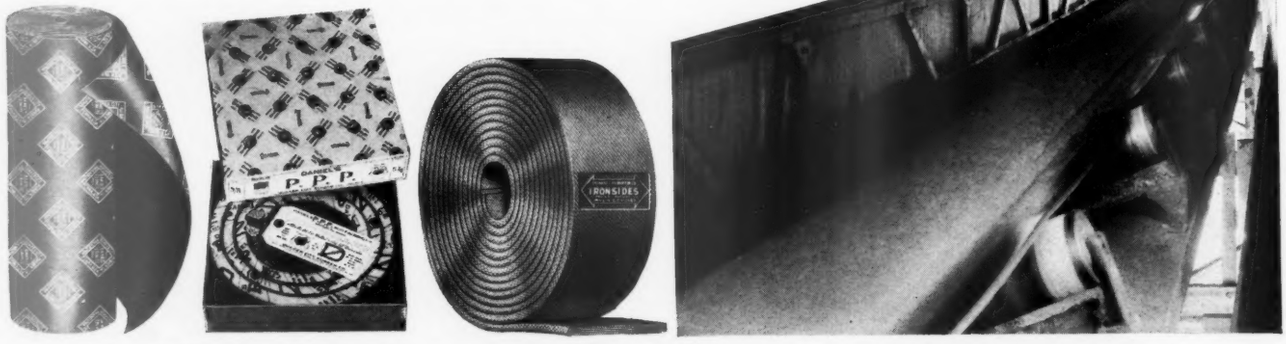

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QUAKER CITY RUBBER COMPANY

OVER 50 YEARS OF CONSISTENT QUALITY

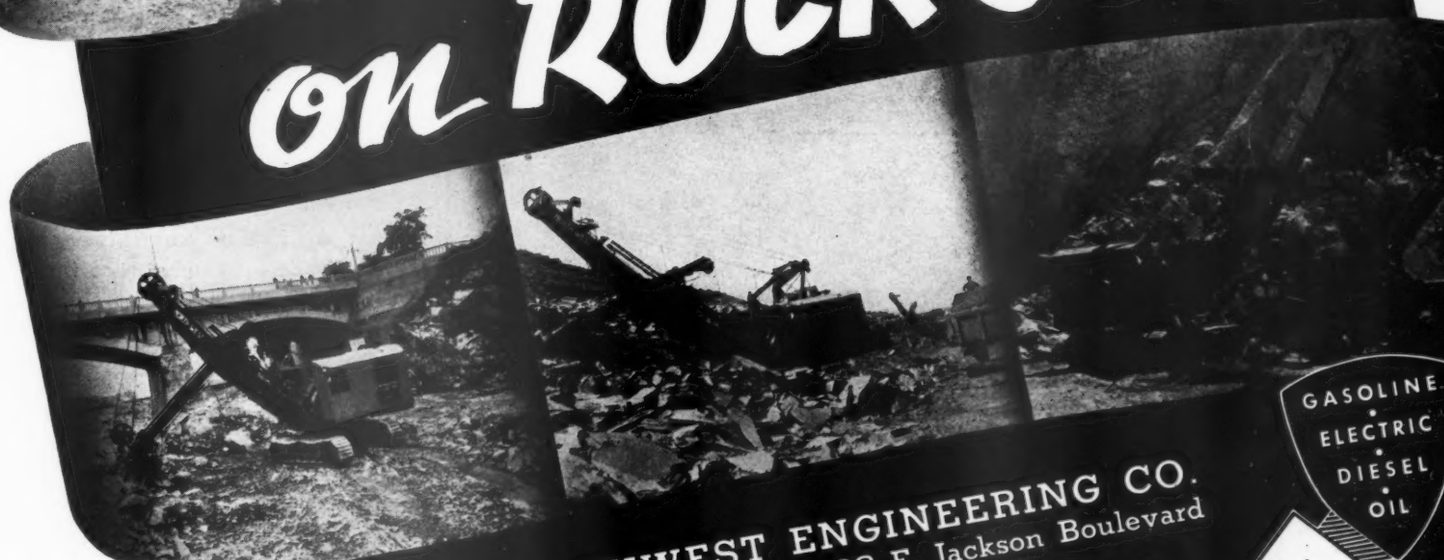
PHILADELPHIA · ***NEW YORK*** · ***CHICAGO*** · ***SAN FRANCISCO***

NORTHWEST

Again

and again

on ROCK JOBS



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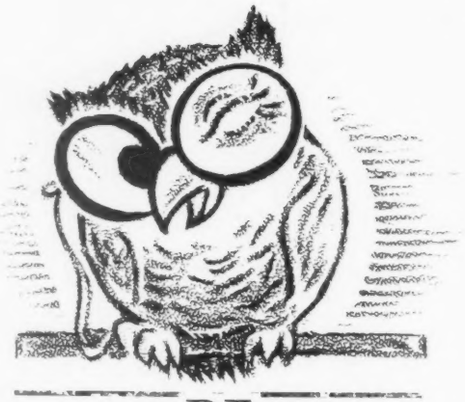

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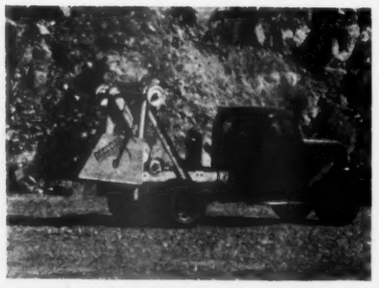
Wise Operators do it the Dempster-Dumpster Way

FASTER LOADING—Men load containers on ground at convenient points—no hard shoveling over high sides of truck box.



FASTER HANDLING—Trucks pick up the loaded containers with automatic hoist—no waiting while men load—saves time.

QUICK DUMPING—Pull a lever, and the container dumps its entire load instantly—right where you want. Ready for next trip.

IF you're wise to competition, you will cut the high cost of hand loading by this modern time-saving method of loading, hauling and handling materials the Dempster-Dumpster way.

In quarry operations, road building and construction jobs, it saves as much as 30% to 50% or more, according to certified reports from users of Dempster-Dumpster equipment.

Now available in sizes from one to six cubic yards capacity—readily mounted on any type truck—automatic hoist and detachable containers. Approved by the Quarry and Construction Industries on many years' service records and unquestionable results.

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DEMPSTER BROTHERS, Inc. KNOXVILLE TENNESSEE

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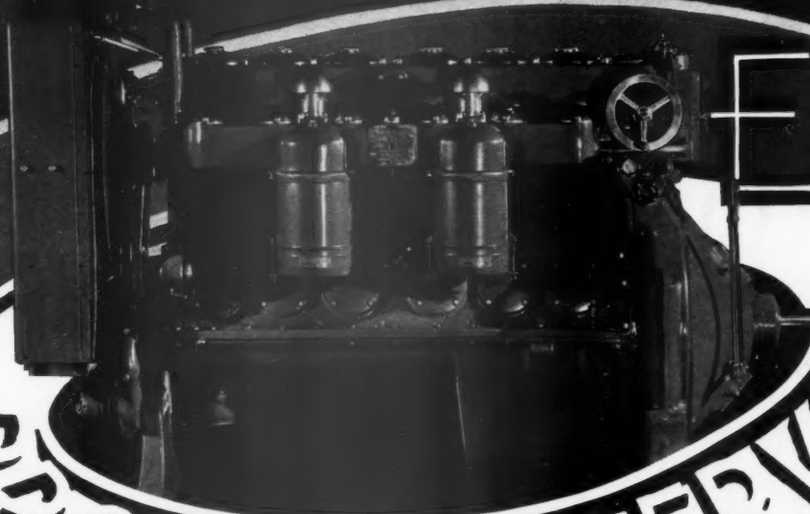
MURPHY DIESEL ENGINE



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-and many more!

The outstanding Advance in Diesel Engines

MURPHY Diesel Engines in the hands of contractors, in crushing plants, in the oil fields, on cotton gins, in the coal industry and in other fields of service all over the country have proved the dependability and economy of Murphy performance. The fact that many of these concerns after operating Murphys for long periods of time bought a second, third or fourth Murphy Diesel is convincing evidence of the high type of service that is made possible by the unusual Murphy advantages.

Let us send you our new bulletin.

MURPHY DIESEL COMPANY LTD.
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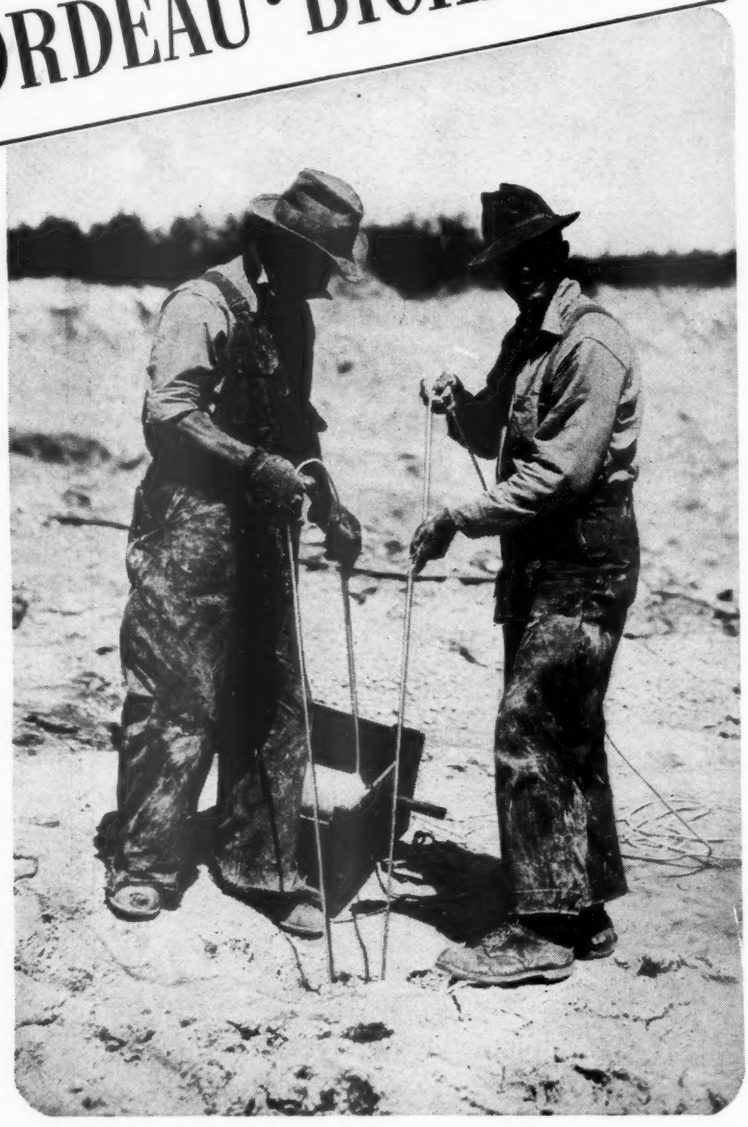
Milwaukee Wisconsin

Ask for a MURPHY DIESEL ENGINE on your Equipment!

Loading Simplified with CORDEAU·BICKFORD



. . . because Cordeau - Bickford Detonating Fuse permits quicker loading, tamping and stemming of each hole. Cartridges may be slipped down alongside the taut line of Cordeau, which remains in direct contact with the whole charge and detonates it at the proper time with the greatest effectiveness.

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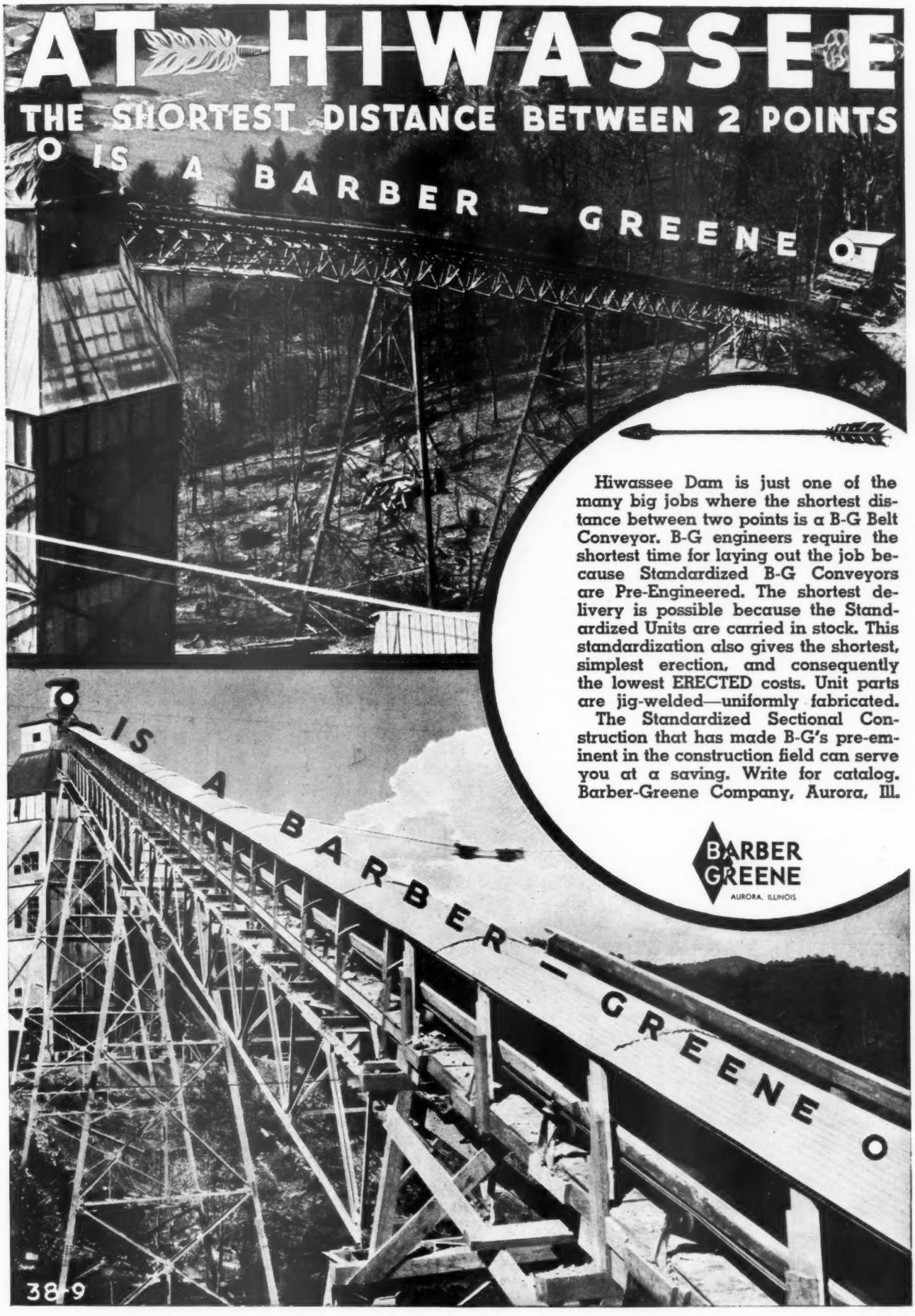
THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONN.

CORDEAU·BICKFORD *Detonating Fuse*



Hiwassee Dam is just one of the many big jobs where the shortest distance between two points is a B-G Belt Conveyor. B-G engineers require the shortest time for laying out the job because Standardized B-G Conveyors are Pre-Engineered. The shortest delivery is possible because the Standardized Units are carried in stock. This standardization also gives the shortest, simplest erection, and consequently the lowest ERECTED costs. Unit parts are jig-welded—uniformly fabricated.

The Standardized Sectional Construction that has made B-G's pre-eminent in the construction field can serve you at a saving. Write for catalog. Barber-Greene Company, Aurora, Ill.

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AURORA, ILLINOIS

"... BENEFITS ARE DOUBLE"

ADAMS BROTHERS, central Ohio sand and gravel producers, are reaping double benefits from their LeTourneau Model "G" Carryall Scraper: They're effecting a short cut to lower gravel costs at their Coshocton pit . . . at the same time, they've put their old gas "60" tractor back into the profit column.

12,000 yards of top soil is being removed . . . most of it heavy, wet clay. Yet, the Carryall loads in distances as short as 40 feet. Even in the most adverse conditions, good average loads are gained in but 70 feet, as the cutting edge (set at a plow-like angle) goes in with a *natural* suction that puts all tractor power into digging. Again, valuable time is saved at the spoil area. Carryall dumping is but a matter of seconds . . . a touch of the cable Unit lever brings the sliding tailgate clear to the cutting edge, instantly forces out every kind of load. Actual timed cycles of load, haul, dump and return show 1500-foot round trips completed every 6 minutes, with Carryall output averaging 40 excavation yards an hour.

There's a size LeTourneau Carryall ideally suited to your own particular stripping or materials-handling needs—at a price that will best fit your particular job. Your nearest "Caterpillar" dealer will be glad to make recommendations, then arrange a convenient demonstration, right on your job. Savings start the day you see him.

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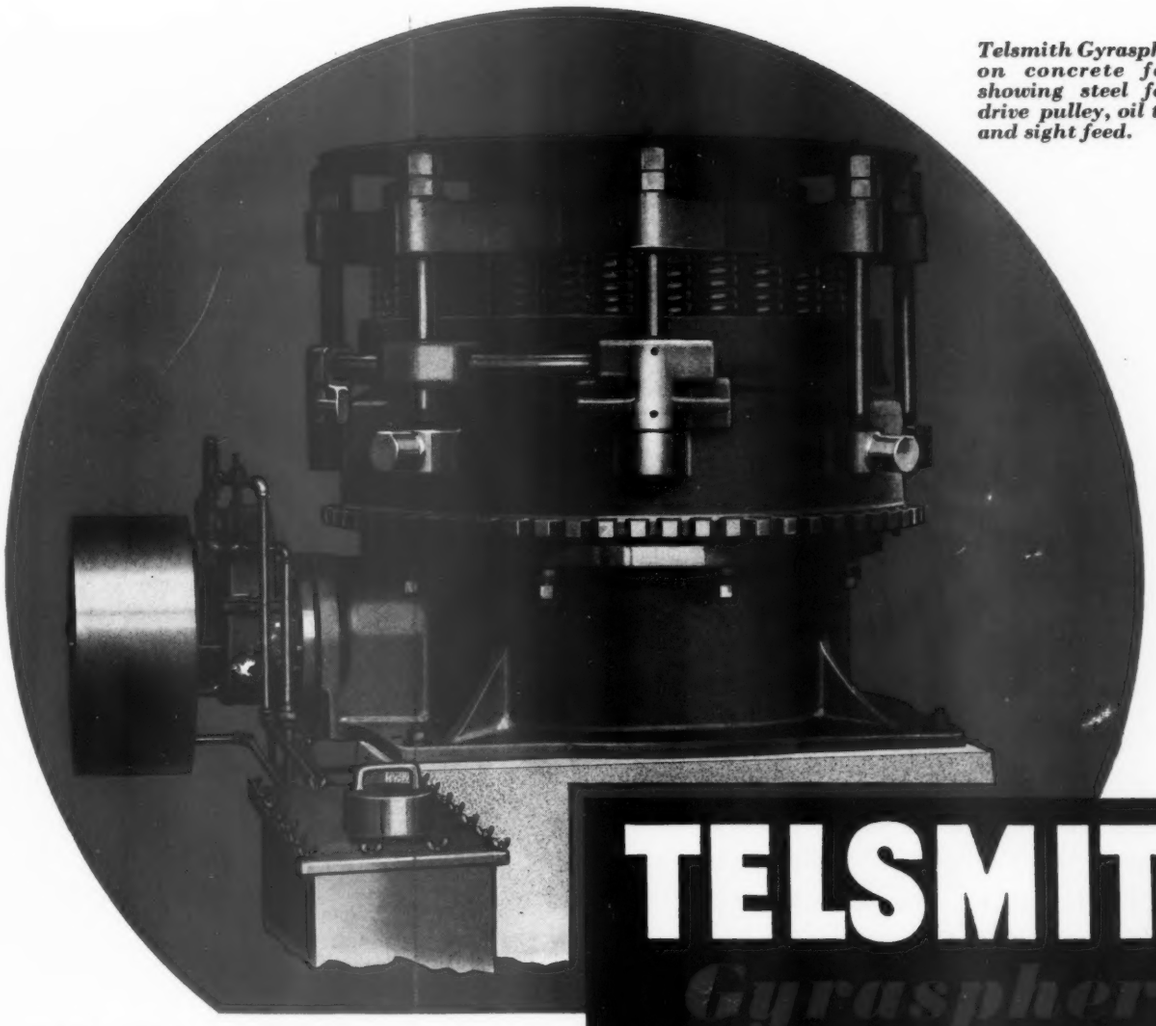
Manufacturers of: Angledozers*, Buggies*, Bulldozers, Carryall*, Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters*, Treedozers. *Name registered U. S. Patent Office.



Telsmith Gyrasphere Crusher on concrete foundation, showing steel feed hopper, drive pulley, oil tank, piping and sight feed.

TELSMITH *Gyrasphere* CRUSHERS

GREATER TONNAGE . . . . .
MORE CUBICAL PRODUCT . .
FINER CRUSHING . . . . . .

with less trouble . . . less power . . . less upkeep

Here's a secondary crusher that knows its job—and has what it takes to do it.

It's as simple as that. All *you* have to do *for* the Telsmith-Gyrasphere is to set it for the size you want—ranging from ⅜″ to 1½″ with standard concave; or ⅛″ to ⅜″ with special concave.

Then bring on your rock—and let your conscience be your guide—excess feed means nothing to this baby. The Gyrasphere *can* . . . and does take it! Yes, sir—an unlimited, unregulated choke feed. *That means tonnage!*

When it comes to crushing, the Gyrasphere doesn't "crack down" on the rock. It *thrusts up.* The spherical head and its corresponding concave are like an *inverted* mortar and pestle. Rock is caught between two multi-curved surfaces—and *cubed.* That means an improved product with fewer oversize slabs and splinters.

We could write a book about the Gyrasphere. We have, but it's brief, interesting and gives all the facts. Mailed without cost or obligation. *Ask for Bulletin Y-15.* YC-12

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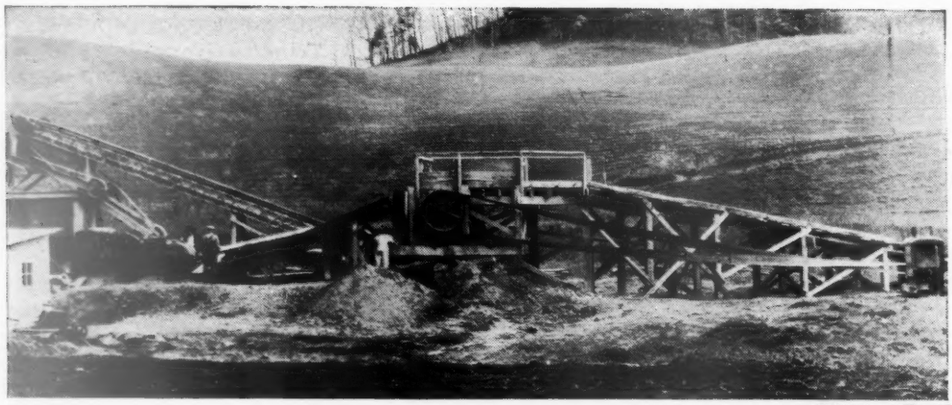
Choctaw C. & M. Co., Memphis, Tenn.

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE, WIS.



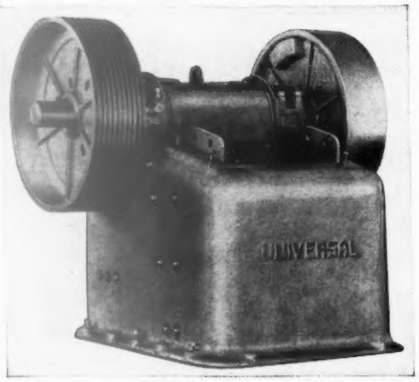
Left: Universal Dual Crusher Stationary Plant near Mountain City, Tenn., reducing field stones for road materials. Below: A new "Streamlined" Universal 1016 Jaw Crusher crushing road rock near Winston-Salem, N. C. Your crushing job, like these, can be done more profitably with Universals!

Wherever Crushing is Being Done Most Profitably..... You'll find UNIVERSALS!

because Universal Crushing Equipment produces the greatest volume of crushed rock or gravel in the shortest space of time at the lowest cost per yard.

Every detail in the design of Universal Crushers and Crushing Plants contributes to their unequalled performance—larger bearings, stronger frames, quicker product size adjustment—lower weight—features that have kept Universals out in front for 32 years!

Check up on what Universals can do for you—profit by the savings they effect!



Streamlining gives the New 2436 Universal Jaw Crusher a stronger base, plus a saving in weight of up to 20%, providing greater portability and lower shipping and handling costs.

There are 25 other sizes of crushers in the Universal Line and over 50 Stationary, Semi-Portable and Portable Crushing, Screening and Loading Plants; also Portable Crushers, Roll Crushers, Pulverizers and accessory equipments. Write for new literature.

UNIVERSAL CRUSHER COMPANY

619 C Avenue West

Cedar Rapids, Iowa

UNIVERSAL

LUDLOW-SAYLOR WIRE CO.
634 S. Newstead Ave.
St. Louis, Mo.

Please send us Book No. 82.

Rochester Public Library
115 South Avenue

Note these points of Quality in

STA-TRU

Long-Slot Woven Wire Screens

STA-TRU screens are specially designed for screening machines with tensioning devices which tend to stretch the crimps in ordinary screens when under load.

The straight stay-bars in STA-TRU have no crimps to stretch. They carry the full load of tension and vibration.

STA-TRU can not be caused to sag or split by the pull of tension members of vibratory screening machines.

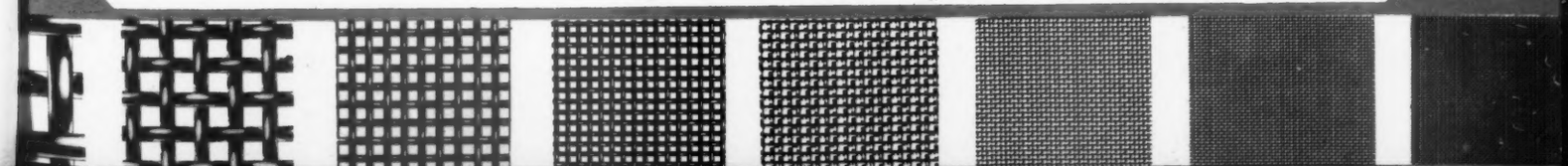
The longitudinal wires in STA-TRU screens are all in one plane between their intersections, so that all the long openings are of uniform width throughout their length.

Ask for bulletin and samples. Quotations are furnished promptly on receipt of specifications.

"The Perfect" WIRE CLOTHS and WOVEN WIRE SCREENS

— Steel — Super-Loy — Galvanized — Tinned — Monel — Nickel — Brass — Bronze — Stainless —

The LUDLOW-SAYLOR WIRE COMPANY ST. LOUIS



LUDLOW-SAYLOR WIRE CO.
634 S. Newstead Ave.
St. Louis, Mo.

Please send us Book No. 82.

Note these points of Quality in

"The Perfect"

SQUARE-MESH WIRE CLOTHS

"Perfect" weaves have the *specified* number of wires per lineal inch, throughout their area.

The mesh counts *as specified,* in shoot as well as in warp.

The wires are spaced with pains-taking precision—they lock themselves in place at every intersection—they can not creep or rub together or saw against each other.

All wires are of specified diameter, composition, color, temper and general appearance, and of the finest metal or alloy obtainable in the grade specified.

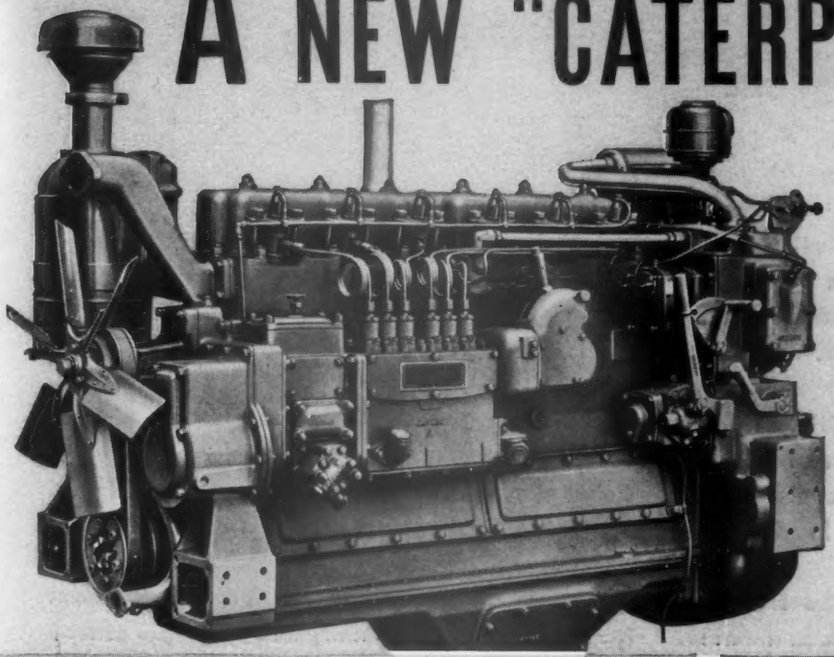
Ask for bulletin and samples. Quotations are furnished promptly on receipt of specifications.

"The Perfect" WIRE CLOTHS and WOVEN WIRE SCREENS

— Steel — Super-Loy — Galvanized — Tinned — Monel — Nickel — Brass — Bronze — Stainless —

The LUDLOW-SAYLOR WIRE COMPANY ST. LOUIS

A NEW "CATERPILLAR" DIESEL FOR SMALL EXCAVATORS



◀ D4600—6 cylinders—69 horsepower at 1550 rpm. with full equipment.

KOEHRING *dragline powered by a D4600. Owned by Boh Bros.; working in New Orleans.*

LORAIN 40 *powered by a D4600—loading top soil on Georgia road construction. Owner, John Monaghan.*

IDEALLY fitted for powering small excavators is this sturdy, smooth-running, new six-cylinder engine. Its design incorporates the same time-proved features which have made "Caterpillar" Diesel Engines famous the world over. Its quick response to variable loads means maximum hourly dirt-moving capacity. With ordinary care, its precision manufacture and quality materials promise long stretches of dependable operation and long serviceable life. Its performance is strictly comparable to that of the larger "Caterpillar" Diesel Engines now being used in larger excavators. Its simplicity eliminates the need of delicate or frequent adjustments. Its frugal use of low-cost fuel makes it more economical than any other type of power. It is backed by the most complete and readily available parts and mechanical service of any engine in the world.

Watch one of these compact "packages of power" in action and be convinced of its outstanding efficiency. Then insist on one in your new excavator. You can get "Caterpillar" Diesel power in all leading makes of shovels, cranes, draglines and other powered contracting and industrial equipment.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

BAY CITY *dragline powered by a D4600. Working near Marietta, Georgia.*

CATERPILLAR DIESEL ENGINES

REG. U.S. PAT. OFF.

NINE SIZES—32 TO 160 HORSEPOWER

Do You Know That . . .

"siliceous dusts are not soluble in the body fluids, and when introduced into the respiratory tract in the form of particles of the proper sizes and in sufficiently high concentration produce nodular growths that often result in silicosis." (p. 377, *Dust Collection.*)

"the essential points to bear in mind when selecting compressor oils are that they should possess adequate viscosity at the operating temperatures and that they show little tendency to vaporize or to deposit hard carbon residues." (p. 527, *Lubrication.*)

"rock is ready for pulverizing when it has been brought to about 1½ in. in diameter." (p. 191, *Crushing, Grinding and Air Separating.*)

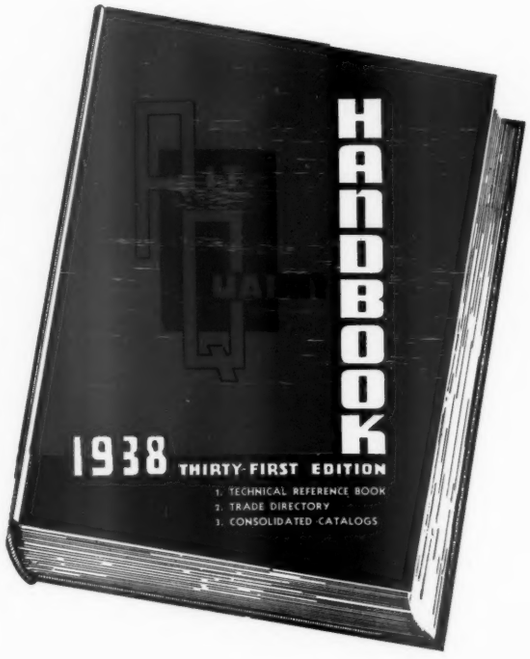
"a dredging pump makes its greatest power demands when pumping large quantities against very low heads. In figuring . . . . .(p. 57, *Hydraulicking and Dredging.*)

"the general advantages of punched plate are that it gives a maximum area of wearing surface, is rigid, has openings of uniform size, is more readily adjusted than screen frames, has no tendency to pull away or sag, does not tear out, and certain parts may be left blank." (p. 271, *Screening, Classifying, and Washing.*)

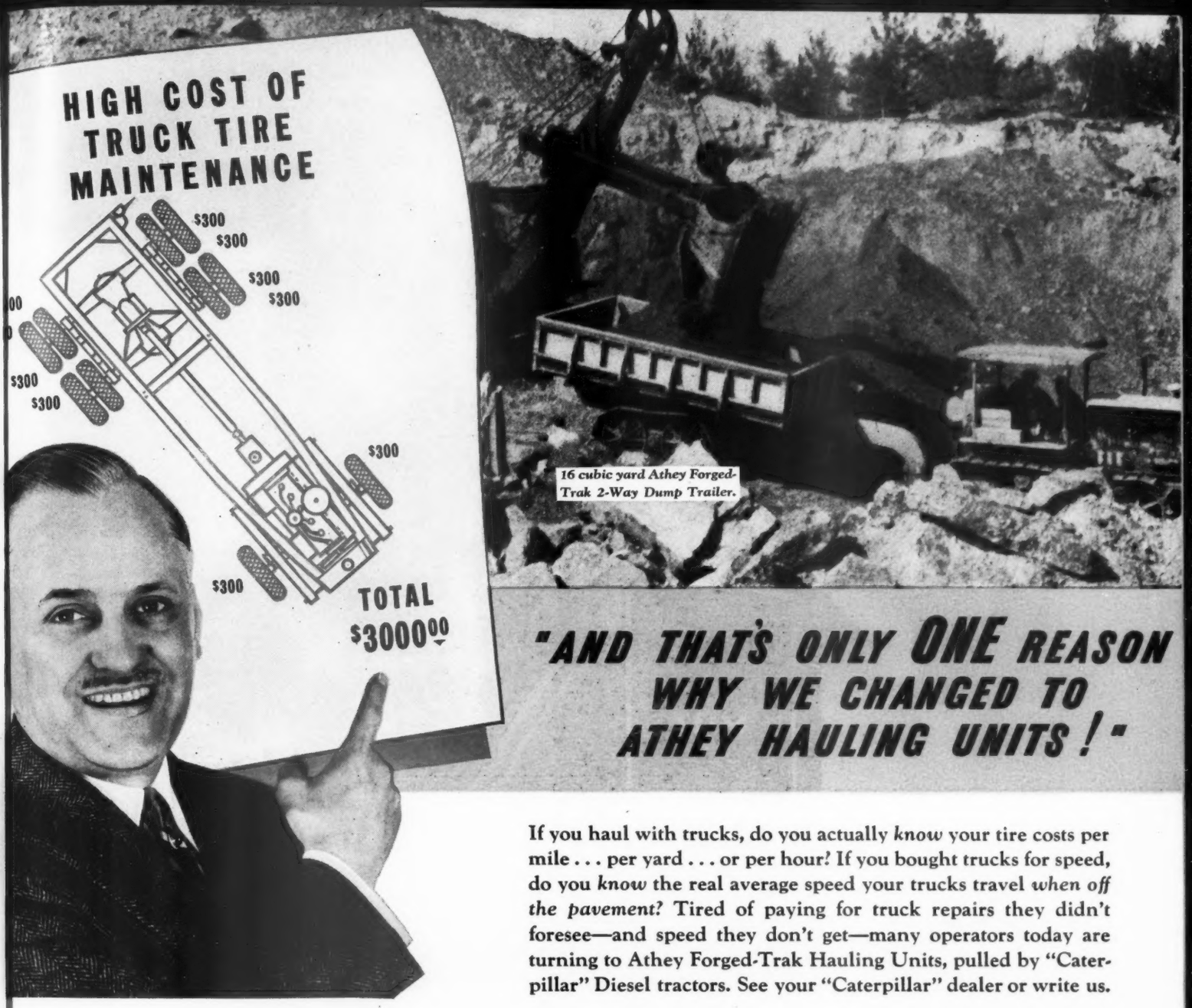
These and thousands of other equally interesting and useful facts will be found in the 1938 edition of Pit and Quarry Handbook. Are you using your copy as often as you should? Do you turn to it when you are brought face to face with a new, baffling problem?

Whether the question is one of plant design or plant operation you can be almost certain of finding help in the handbook. Open it to-day—at any chapter, at any page—and see if it does not repay you for the time and effort with new facts, new interpretations, new slants. Get the habit of making it serve you as it does many hundreds of other "practical" and "technical" operating men.

If you are a producer of aggregates, cement, lime, gypsum or other nonmetallic minerals and do not own a copy of the new edition of Pit and Quarry Handbook, send in your application for one on your company letterhead. Simply state what use you expect to make of it, and what your position is. We still have a limited number of copies available for free distribution among nonmetallic-mineral producers only.



PIT AND QUARRY HANDBOOK
538 South Clark Street **Chicago, Ill.**



16 cubic yard Athey Forged-Trak 2-Way Dump Trailer.

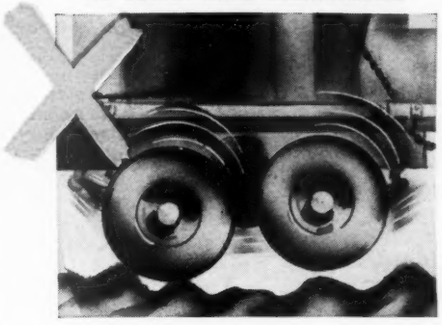
"AND THAT'S ONLY ONE REASON WHY WE CHANGED TO ATHEY HAULING UNITS!"

If you haul with trucks, do you actually *know* your tire costs per mile . . . per yard . . . or per hour? If you bought trucks for speed, do you *know* the real average speed your trucks travel *when off the pavement?* Tired of paying for truck repairs they didn't foresee—and speed they don't get—many operators today are turning to Athey Forged-Trak Hauling Units, pulled by "Caterpillar" Diesel tractors. See your "Caterpillar" dealer or write us.

NO HIGH TIRE REPLACEMENT COST

Toughest rubber tires can't stand up under the gouging, gashing and ripping of sharp rocks—frozen chunks of mud, gnarled roots and stubborn stumps! Athey Forged-Trak Wheels are not affected by these rubber tire hazards. They over-ride or beat down all such opposition.

NO COSTLY ROAD MAINTENANCE



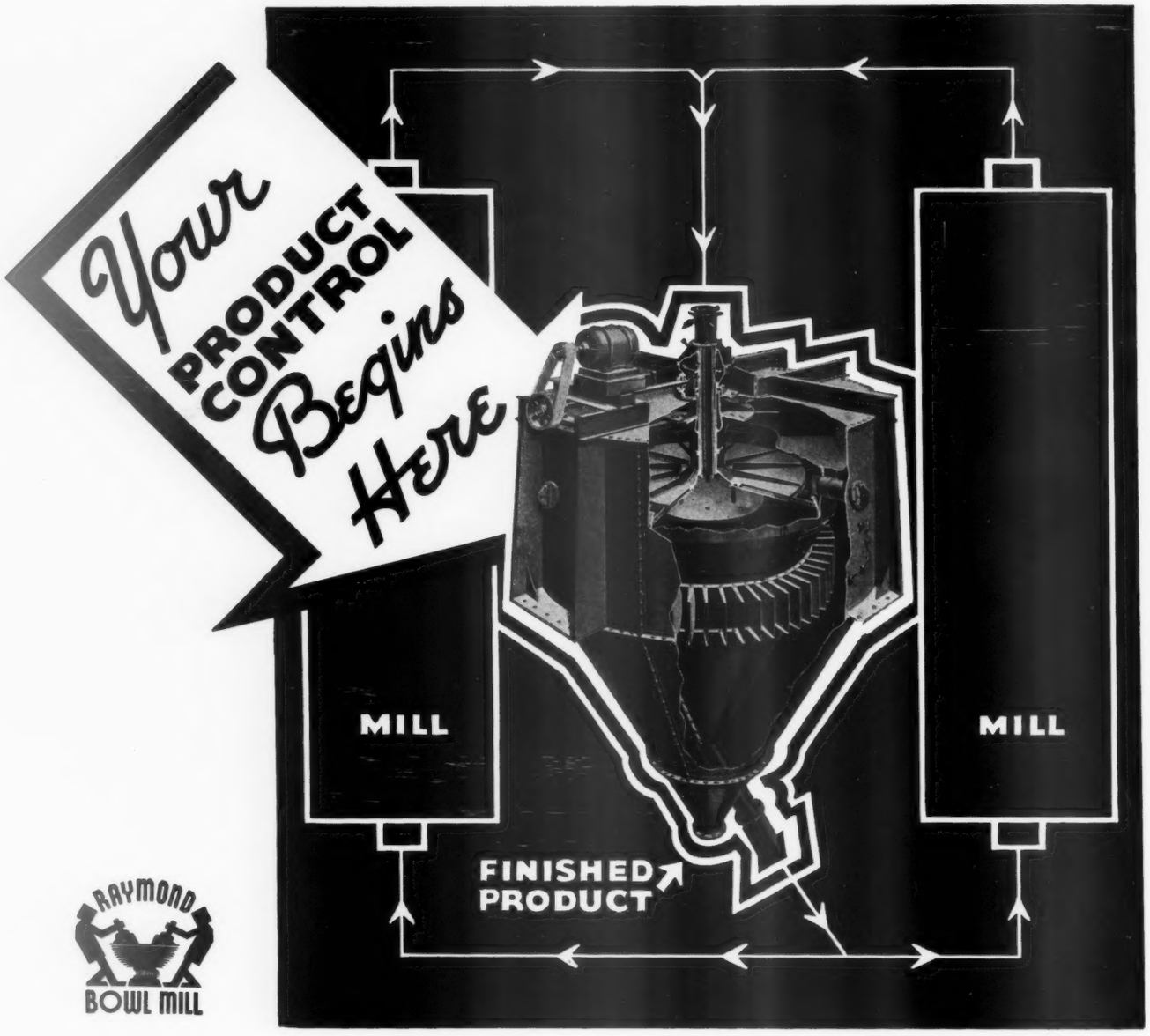
When you use Athey Forged-Trak Hauling Units, you don't need to spend good money maintaining a smooth roadbed. The broad, firm tracks of Athey equipment actually *improve* the road on which they travel . . . surmount or beat down obstacles. And Athey wheels are *non-miring.*

NO CONSTANT, EXPENSIVE REPLACEMENT

Hauling with trucks means frequent outlay for badly worn and bruised tires, rear axles and other parts . . . replacing the entire hauling unit within a relatively short time. With Athey Forged-Trak Units, you don't have to worry about washboard roads—slippage—overloads that attack tires.

ATHEY TRUSS WHEEL COMPANY, 5631 West 65th Street, CHICAGO, ILL. *Cable Address: "Trusswheel," Chicago*

ATHEY FORGED-TRAK REG TRADE-MARK **ATHEY WAGONS & TRAILERS**



RAYMOND *Whizzer Separator*

The Separator for "high early" cements:

- Uniform particle sizes
- Maximum surface areas
- Increased mill production
- Wide range of adjustment
- Extra sturdy construction
- Fine bearings and shafts

THE first step in modernizing your cement plant to a higher profit ratio is to gain maximum efficiency in your closed circuit operations by adding a Raymond Mechanical Air Separator to your chain of equipment.

This advanced unit—built by the originators of air separation—is equipped with the latest features for regulating the fineness and insuring uniform classification, including: externally operated damper slides, and the patented revolving whizzer, single or double type.

The Raymond Separator is adjustable over a wide range from 1600 to 2700 surface area. Its operating economy and extra high capacity make it a major factor in reducing cement costs.

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1321 North Branch Street - CHICAGO

Write for Bulletin No. 35

Sales Offices in Principal Cities
Canada: Combustion Engineering Corporation, Ltd., Montreal

HIGH HAULAGE COSTS CAN BE *Lowered*

with Republic Conveyor Belts

REPUBLIC Conveyor Belts have cut haulage costs to lowest possible levels in hundreds of industrial plants. With other production costs rising rapidly, a more efficient handling system may solve your problem of how to maintain profits without excessive price increases.

Republic Belts are efficient in two ways—first, they lower the cost per ton—second, they reduce belt costs because of their exceptionally low maintenance and long life.

The body of Republic Conveyor Belting, designed for the rock product industry, consists of heavy, close woven duck, strong enough to withstand the tremendous stress of heavy loads. Covers are made from the toughest and longest wearing rubber compounds in order to resist cutting, gouging and abrasion.

New high records for efficiency are constantly being set by Republic Conveyor Belts. They will do the same for you.

REPUBLIC RUBBER

Division OF LEE RUBBER AND TIRE CORPORATION

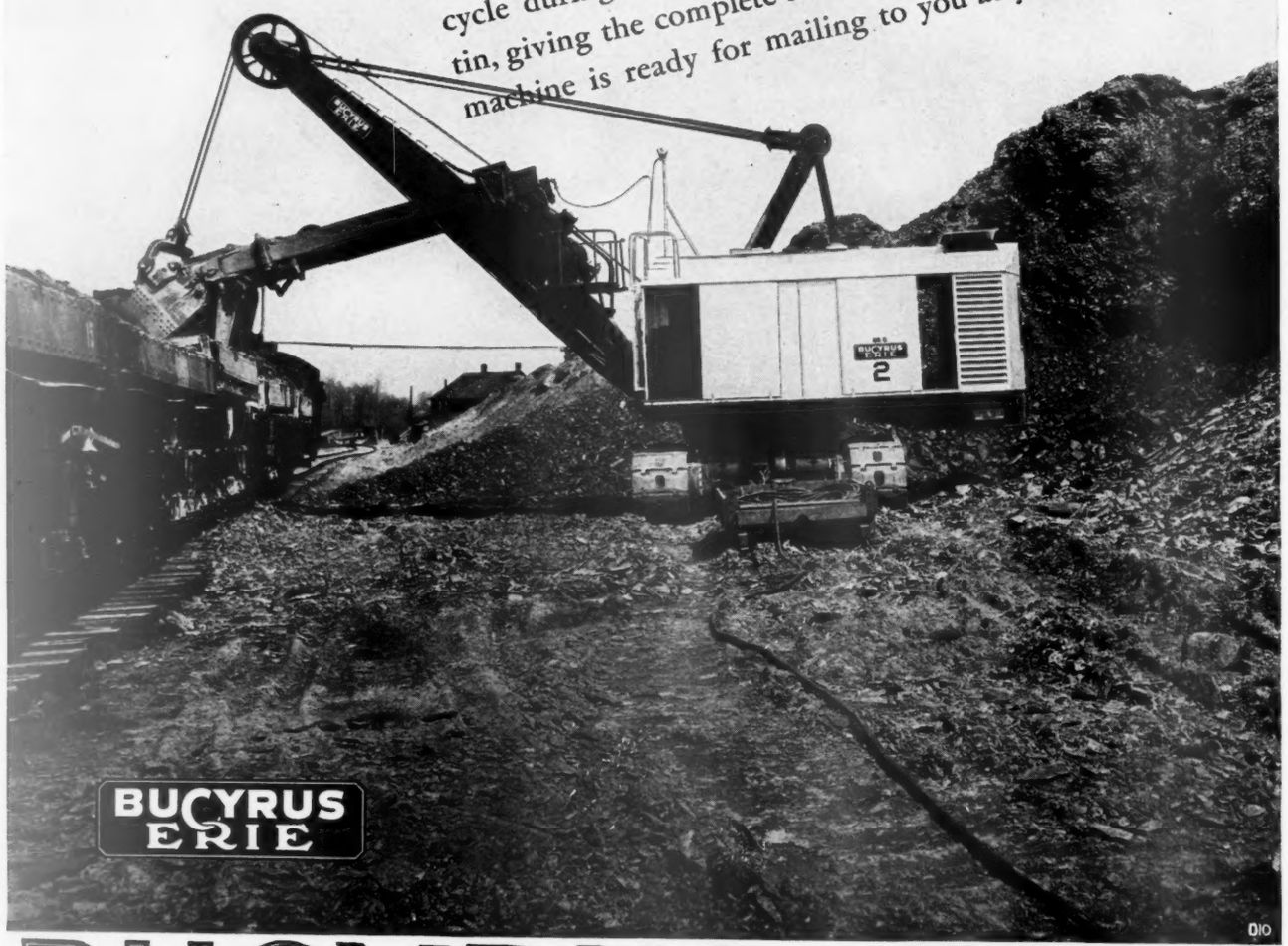
YOUNGSTOWN, OHIO

Manufacturers of HOSE
BELTING • PACKING
MOLDED PRODUCTS

ORDER REPUBLIC RUBBER PRODUCTS FROM YOUR DISTRIBUTOR

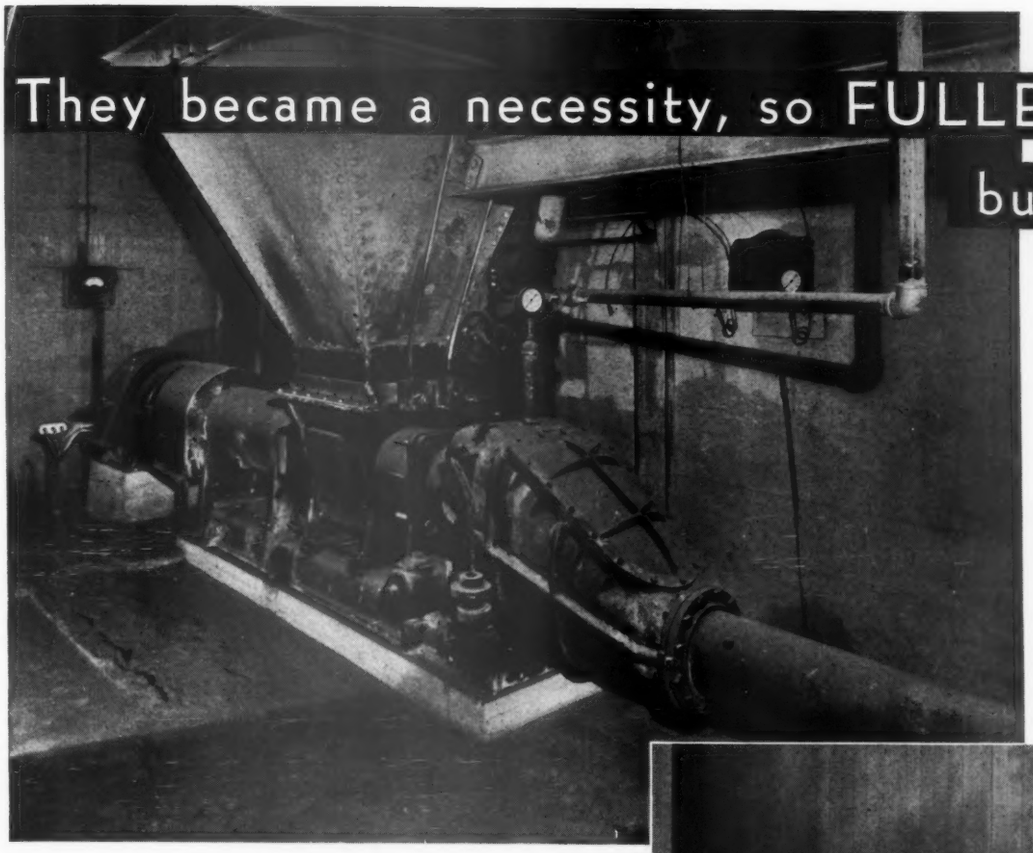
Bucyrus-Erie 85-B cuts loading costs

The 85-B is a machine for big output—it fills the dipper rapidly, swings fast, stops quickly, and dumps cleanly and easily. Electric braking action of the Bucyrus-Erie full Ward Leonard control permits accurate spotting and clips time-saving seconds off the cycle during loading. An illustrated, 28-page bulletin, giving the complete story on this modern 2½-yd. machine is ready for mailing to you at your request.



BUCYRUS-ERIE

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

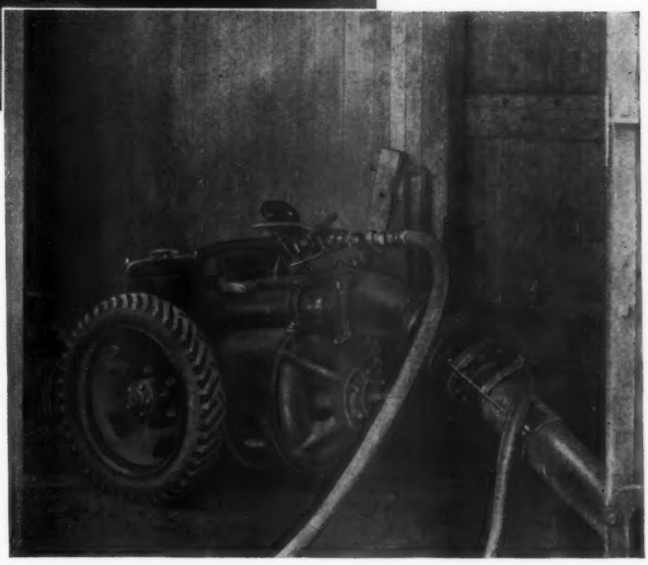


FULLER-KINYON PUMPS

WHEN safer and quicker methods for conveying dry pulverized materials became a necessity, the Fuller-Kinyon Stationary Pump was developed and placed on the market. Since that time many refinements and improvements have been made to the system. The latest, the Type "H" Pump shown above, is the result of many years of practical experience and has many advantages over previous models. A few of the outstanding features are: operated on low-pressure air supply; adapts itself automatically with minimum power input to variations in the rate of feed; pump seal is automatically variable to the minimum density, thereby reducing both power and wear.

Another epoch in the handling of materials. Eight years ago Fuller engineers built the first Fuller-Kinyon Portable Unloader. Contractors, ready-mixed concrete plants, and many others quickly saw the advantages offered by such a machine.

1937—The Fuller-Kinyon Automatic Remote-Control Unloader, a far cry from the first types built, is everything the word implies. Handled by the operator by remote control switch and cable, he need not enter car, barge, or bin being emptied. He starts, stops, and guides the movements of the machine—forward, backward, right or left, by this same control switch. Photo at right shows one of these machines unloading a car of bulk cement.



FULLER COMPANY
CATASAUQUA, PENNSYLVANIA
Chicago: 1118 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.

P-35

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · AUTOMATIC BATCH WEIGHERS · · · BIN SIGNALS

European Cement Mills reduce grinding costs

Surpass American practice by crushing cement clinker to a smaller size mill feed

Wherever fine crushing and grinding is done, it has become an accepted fact that it is more economical to reduce by crushing than it is to grind with a coarse grinding mill feed. This has long been recognized in the mining industry where Symons Short Head Cones are being used for fine crushing by major metal producers everywhere. Within the past few years, this practice has also been adopted by cement mills in Central Europe where Symons Cones are crushing kiln run clinker to grinding mill feed at a substantial saving over methods previously used. Here is the average analysis of feed to grinding mills in some of the European plants:

Minus 4 mesh — 80 to 90 per cent.
Minus 8 mesh — 60 to 70 per cent.
Minus 20 mesh — over 20 per cent.
Minus 200 mesh — over 8 per cent.

The Symons Short Head Cone Crusher was primarily developed for extremely fine crushing and is especially suited for crushing cement clinker to a more desirable grinding mill feed. Further information on the performance of Symons Cone Crushers and their application for cement mills will be sent upon request.

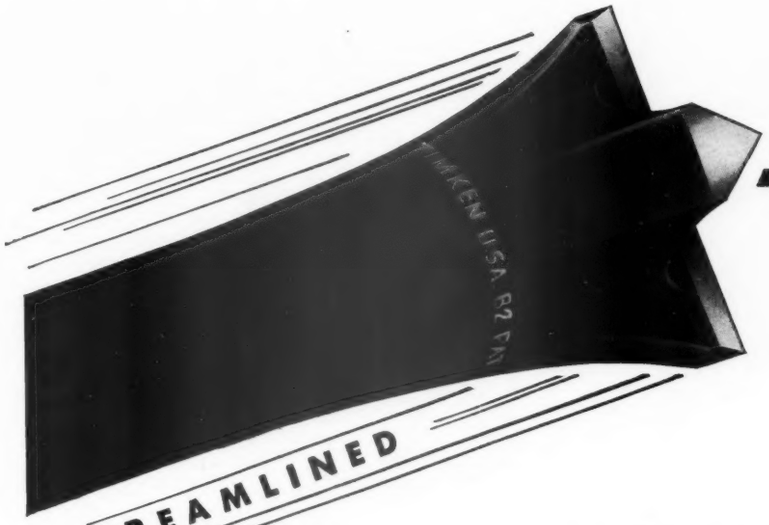
Some Advantages Of Crushing Clinker With SYMONS CRUSHERS

- Smaller feed increases grinding mill output with same power input.
- Smaller feed eliminates the need of large grinding balls and lengthens liner life.
- Lowers the cost of cement production and increases profits.

NORDBERG MFG. CO., MILWAUKEE, WIS.

NEW YORK • LOS ANGELES • TORONTO • LONDON

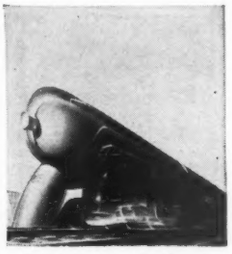
SAVE YOUR DRILLERS' TIME WITH TIMKEN ROCK BITS



You pay your rock drillers for the time they work. It will pay you to give them tools that will enable them to make the most of their time —TIMKEN Rock Bits.

A driller can put down more holes in a given time at lower cost with TIMKEN Bits than with the best forged steel he has ever used. TIMKEN Bits *drill faster* and *last longer* because of their streamlined design, shoulder construction and the TIMKEN Electric Furnace Steel of which they are made.

TIMKEN Bits, being removable, reduce steel handling on the job. When a bit becomes too dull to drill effectively the driller simply unscrews it, puts on a new one and goes right on drilling. This also is a definite source of time saving.



The New 20TH CENTURY LIMITED rolls on TIMKEN Bearings.
GLIDE—as you ride a Timken Bearing-equipped train

The removable feature is responsible for another big economy—elimination of reforging cost with its incidental expense, maintenance of forging equipment and investment in steel. Due to their great depth of hardness, TIMKEN Bits can be resharpened several times by a comparatively simple grinding operation, each resharpening giving them a new lease on life.

The sooner you adopt TIMKEN Rock Bits the more you will save. Why not adopt them now? We will be glad to arrange a demonstration at any time.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

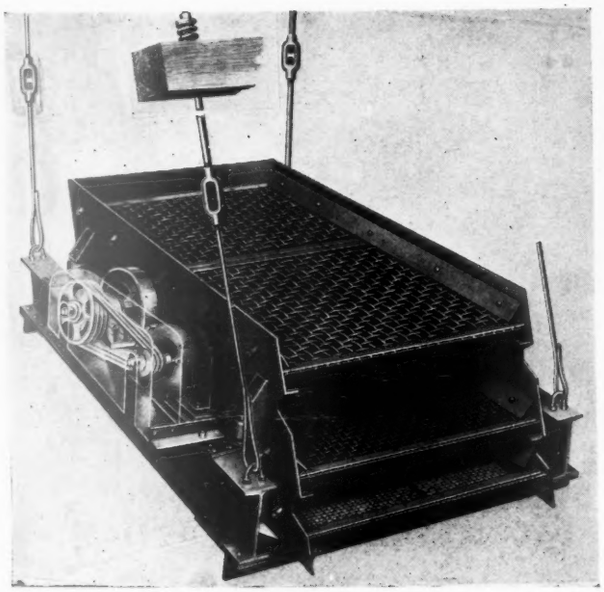
TIMKEN
ROCK BITS

For CAPACITY Plus ACCURACY in Classifying Materials

KENNEDY
VIBRATING SCREENS

You can keep your tonnage up and get the most accurate sizing with a Kennedy Vibrating Screen. These rugged units are built to stand the hardest service with a minimum of repairs.

The Kennedy Vibrating Screens for coarse or fine screening are available in 1, 2, 3, or 4 decks and in sizes to handle any capacities. They require little headroom and may be suspended or mounted on stationary supports.



KENNEDY
WASHING CLASSIFIERS

The Kennedy Cone serves three purposes in one. It can be used as a Classifier to separate materials to any degree of fineness desired, as a Dewaterer to considerably lower the moisture content of material, and as a Washer to clean a wide variety of products.

The Kennedy Classifiers require no motors and have no wearing parts, which minimizes both original and maintenance costs. These units are being used for the production of Concrete and Mason sand to meet the most rigid state specifications.

Our Engineering Staff will gladly make recommendations for a solution to your problems

Write on your letterhead for a copy of our new Bulletin No. 35, 2nd Edition—It's just off the press!

KENNEDY-VAN SAUN

MFG. & ENG. CORPORATION

TWO PARK AVENUE NEW YORK, N. Y.

LIMA
HAS ALWAYS
POINTED THE WAY
TO GREATER
VALUE
LOOK WHEREVER YOU MAY, BUT YOU WILL NOT FIND A 3/4 YARD EXCAVATOR THAT OFFERS SO MUCH VALUE, WHICH MEANS—
BETTER PERFORMANCE
GREATER ECONOMY
LOWER UP-KEEP
LONGER LIFE and
HIGHER PRODUCTION
LIMA Laymaster
Laymaster
3/4 yard
Write for a copy of Bulletin No. 034
LIMA LOCOMOTIVE WORKS, INCORPORATED
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LIMA, OHIO
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NEWARK, N.J. 319 Frelinghuysen Avenue
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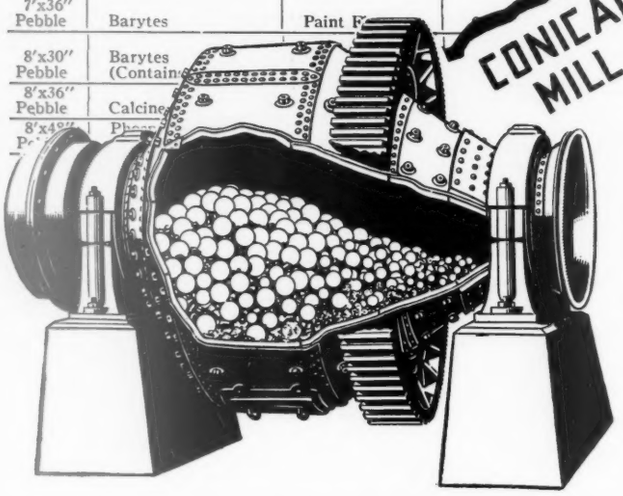
The General Supply Co. of Canada, Ltd. Ottawa, Ont.
LIMA
• SHOVELS • DRAGLINES • CRANES

Grinding

WET GRINDING HARDINGE MILLS—INDUSTRIAL APPLICATIONS

Size and Type Mill	Material Ground	Object	Capacity Tons per hour	Feed Size	Product Size	Ball or Pebble Load Pounds	H.P. Req.	REMARKS
2′x8″ Ball	Limestone	As neutralizing agent	.12	¼″	90% –200M	500 Balls	2	Mill operated in closed circuit with Classifier
3′x36″ Ball	Iron Scale	Furnace Lining	35	⅜″	95% –100M	2200 Balls	15	Product mixed with dolomite to m of open hearth furnaces
4½′x16″ Ball	Iron Oxide	Paint	1.0	50M	99 99% –200M.	4000 Balls	20	Mill is operated in closed cir
4½′x16″ Ball	Brass Ashes & Slag	Recovery of metal from slag	2.5	Minus 3″	Minus 4M. & Fines	3000 Balls	18	Recover about 1800 # of charged on 18″x6′ P
5′x22″ Ball	Aloxite (Abrasive very hard)	Plate Glass Polisher	.33	Minus 60M	99%			
6′x22″ Pebble	White Limestone (Whiting)	Paint Filler	1	Minu				
7′x36″ Pebble	Barytes	Paint F						
8′x30″ Pebble	Barytes (Contain							
8′x36″ Pebble	Calcine							
8′x4	Phos							



•Wet

ABOVE data taken from Bulletin 41 visualizes the wide variety of materials the Conical Mill will handle and the purposes for which it may be employed. There is one best way to grind to ten mesh, and quite a different way when a 325 mesh product is wanted.

•Dry

Some want a granular product, others want extreme fines. Both are readily obtainable using the Conical Mill together with auxiliary equipment that accomplishes this result without dust and waste of energy.

DRY GRINDING WITH HARDINGE MILL AND AIR CLASSIFIER

Size and Type Mill	Material Ground	Object	Capacity Tons/ hour	Feed Size	Mesh Product	Ball or Pebble Load Pounds	H. P. Required		REMARKS
							Mill	Fan	
2′x8″ Ball	Limestone	Chemical Reagent	.20	¼″	65% –200	400 Balls	2.0	.5	
2′x8″ Ball	Limestone	For Filler	.03	¼″	99.7% –325	400 Balls	2.0	.5	18″ Hardinge Superfine Air Cl
3′x24″ Ball	Beryllium Frit	To make Beryllium Oxide	.13	⅛″	98% –200	1600 Balls	8	2	Material hard and abrasive
3′x24″ Ball	Sillimanite (Hard)	Refractory Cement	.25	¼″	80% –100	1400			
4½′x24″ Ball	Fluorspar	Chemical Manufacture	1.1	Minus ¼″		4500			
5′x36″ Ball	Bank Sand	Making Filler for Shingles							
6′x36″ Ball	Kentucky Coal (Dr	Pulverized Fuel fo							

Write for Full Data – Bulletin 41

HARDINGE COMPANY INCORPORATED

YORK, PENNSYLVANIA, *Main Office and Works*

NEW YORK, 122 E. 42nd St. CHICAGO, 205 W. Wacker Drive SAN FRANCISCO, 501 Howard St. DENVER, 817 17th St.

JA-55 Largest of the New I-R Jackhamers

THE JA-55 Jackhamer is the latest addition to the JA family of drills. Larger and heavier than its younger brothers, the JA-30 and JA-45, it is a hard-hitting, fast-drilling tool designed for harder rock and deeper holes.

Unusually low air consumption, per inch of hole drilled, makes it an ideal drill for use with portable air compressors, or wherever the air supply is limited.

It is saving time and money for mines, quarries and contracts all over the world.

Ask for our new 80-page Rock Drill Catalogue No. 4201. It describes this drill as well as the entire I-R line of rock drilling equipment. 186 illustrations.

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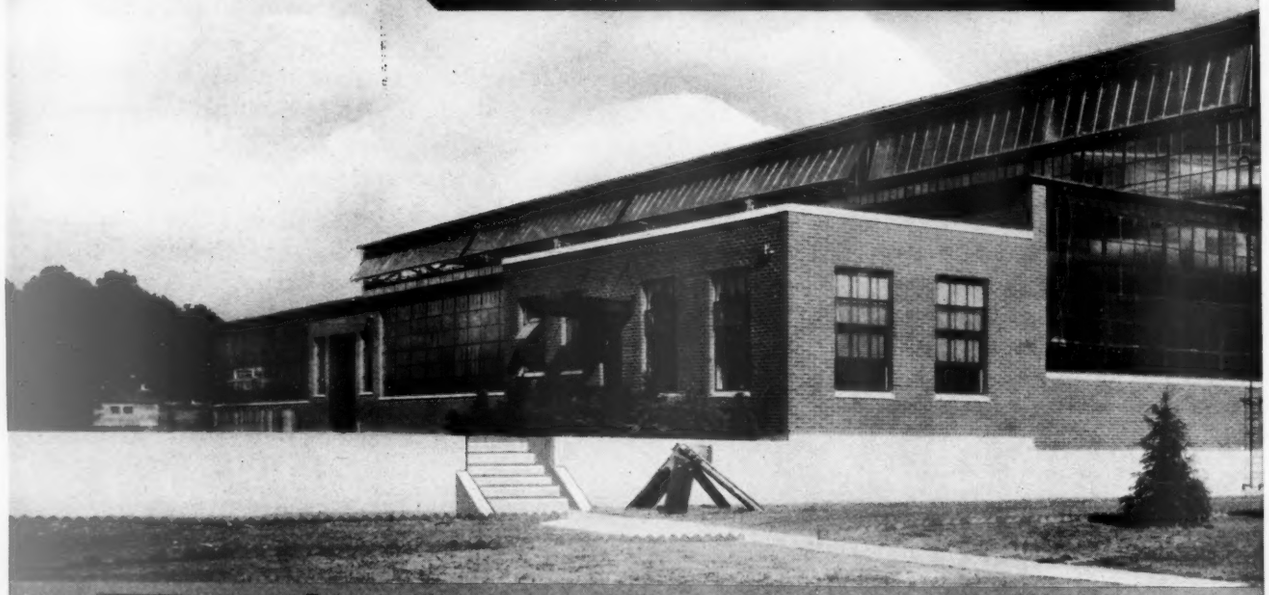

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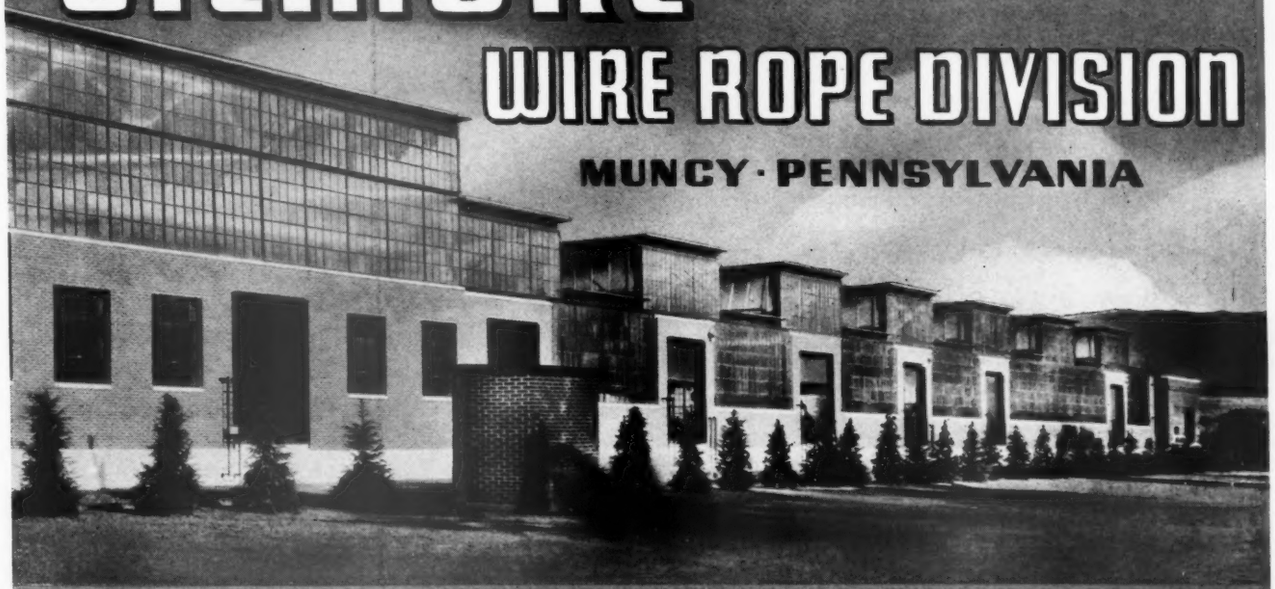

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J&L STEEL

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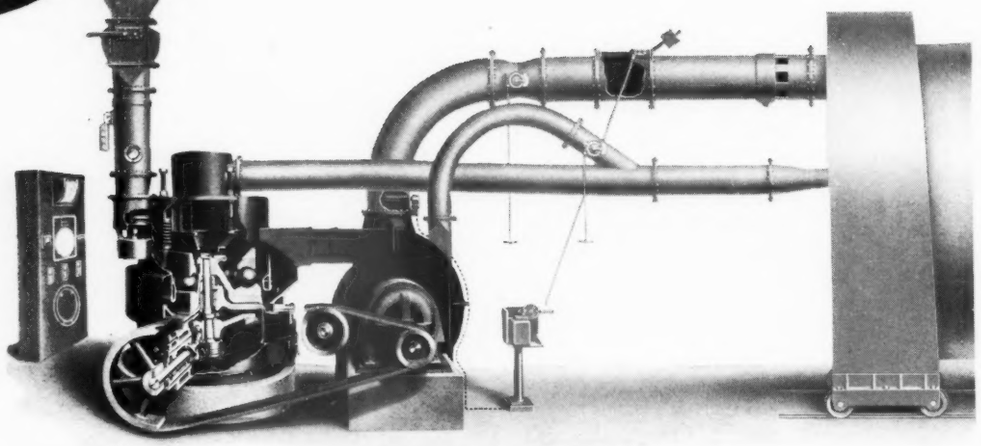

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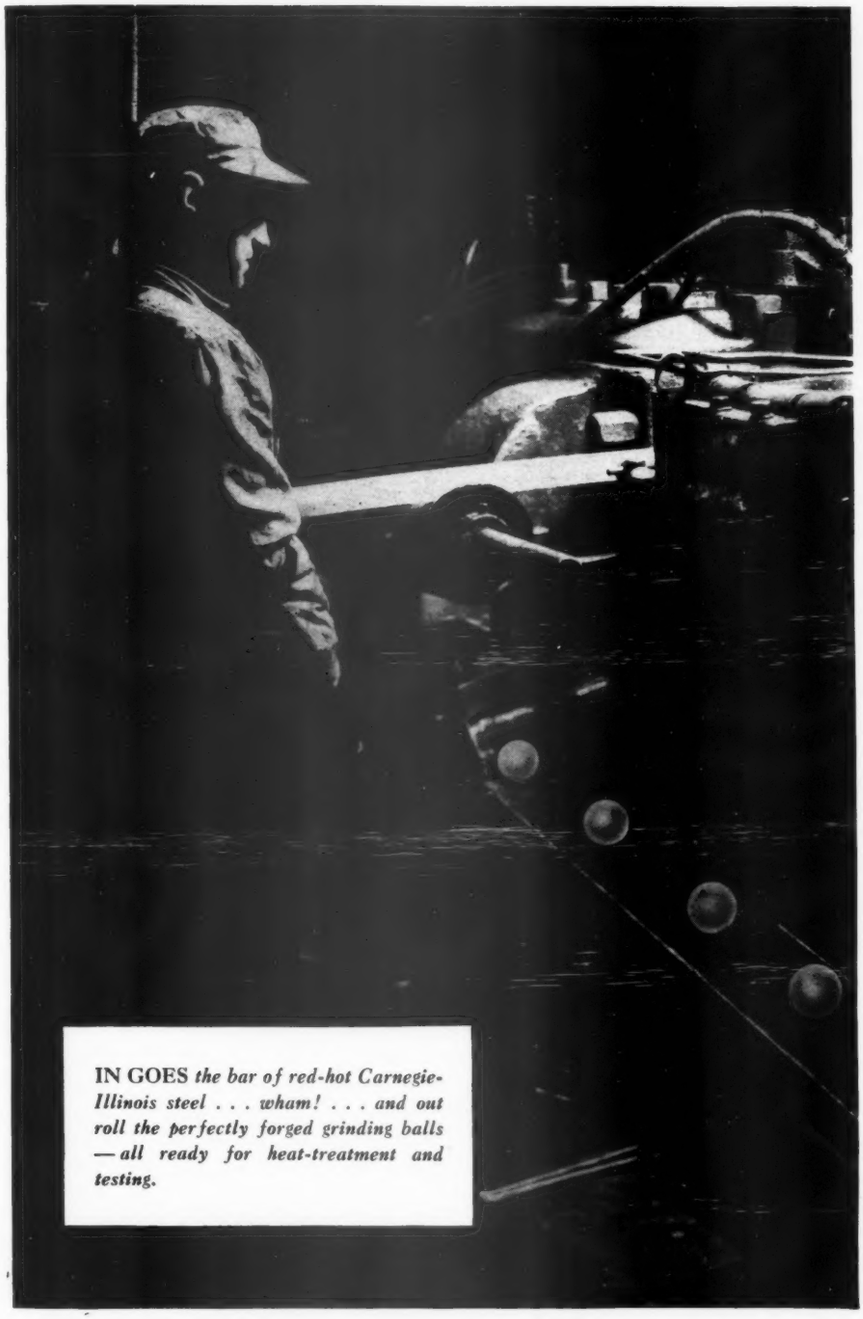

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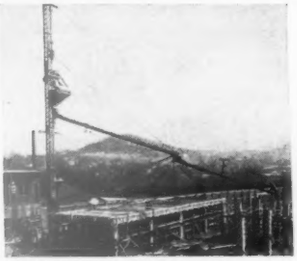

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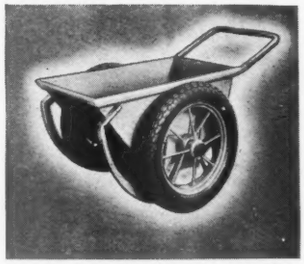

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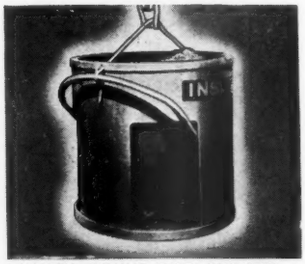

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PIT AND QUARRY

Vol. 31 September, 1938 No. 3

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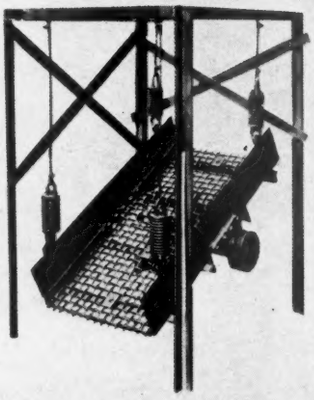

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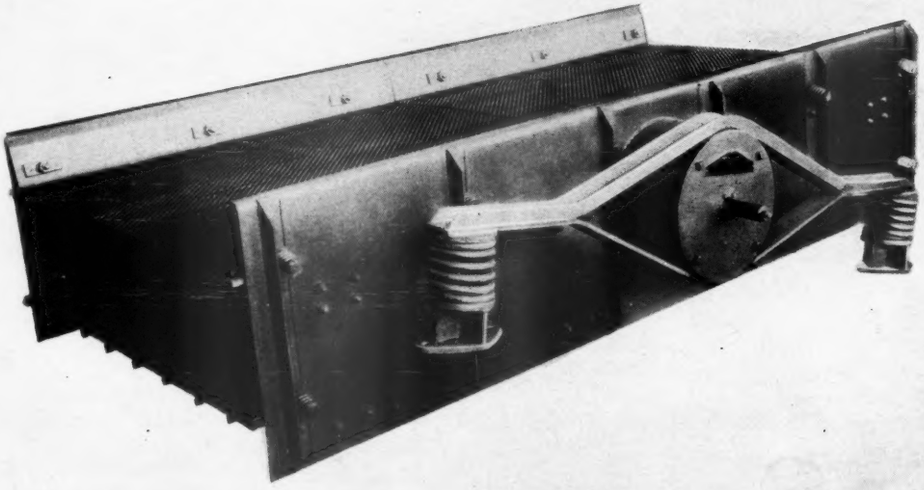

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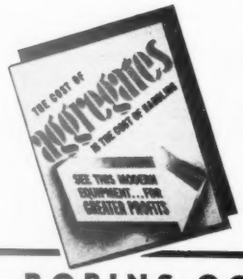

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PIT AND QUARRY

CHICAGO SEPTEMBER, 1938

Building Continues to Maintain Pace

RESIDENTIAL ACTIVITY NOTED

The building industry, paced by residential construction, continued in July to compare more favorably with past records than do the other heavy-goods industries. According to compilations of the F. W. Dodge Corp., the valuation of all residential contracts awarded for July, 1938, was $87,978,000, which is $6,932,000 ahead of July of last year.

The improvement in July residential construction was sufficient to bring the total seven months' figure to a point just 18 per cent. behind the first seven months of 1937. It is interesting to observe that the residential record during this seven month period, while behind last year, is 20 per cent. ahead of 1936. A review of the detailed residential figures for July shows that the entire gain is in one and two-family houses, which augurs well for the near term future because, as yet, relatively few of the large low-rental projects and public housing projects have progressed to the work stage and they are therefore yet to be included in the Dodge statistics.

Contracts awarded for non-residential building in July show a slightly more than seasonal decline of 11 per cent. from June and continue to run behind the corresponding month of last year.

Heavy engineering construction, comprising public works and utilities, has not yet begun to show the effects of the Federal spending program. The July record is down 5 per cent. from last month and 22 per cent. below July of last year.

The value of all contracts awarded, building and heavy engineering combined, for July, aggregate $239,799,000, which is only 4½ per cent. below June, but 25 per cent. behind July of 1937, which was the highest month in the year. This peculiar phenomenon in 1937 was due primarily to the letting of contracts for better than $130,000,000 of work for public ownership. The seven months accumulative of $1,534,071,000, while 15 per cent. below the same period in 1937, is substantially ahead of any other year since 1931.

Fort Peck Concrete Plant Is Dismantled

The concrete-mixing plant at the Fort Peck Dam, Fort Peck, Mont., is being dismantled after having served Addison Miller, Inc., and Fielding & Shepley, Inc., contractors of the spillway gate and cut-off structures, for more than three seasons.

Dual 2-cu. yd. mixers turned out a total of 291,732 cu. yd. of concrete since June, 1935. The plant was designed to turn out 90 cu. yd. of concrete an hour, but in actual practice frequently turned out over 100 cu. yd.

Opens New Stone Plant Near Greenville, Ky.

Operations have been started at the new plant of the Greenville Crushed Stone Co., located eight miles south of Greenville, Ky. Production is being used on road projects in the immediate vicinity, the daily output being in the neighborhood of 100 tons.

Owners of the company are B. L. Andrews, Harry Eaves and Arthur Lile.

Medusa Enters Canada With Ontario Plant

The Medusa Portland Cement Co., of Cleveland, O., has opened a subsidiary plant in Paris, Ont., under the name of Medusa Products Co. of Canada, Ltd. White cement and special paints are to be produced for shipment not only throughout Canada but to all parts of the British Empire.

The Lehigh Portland Cement Co. reports for the twelve months ended June 30, 1938, net profits of $521,505 after taxes and charges, equal after deducting dividends on the convertible preferred stock to 39 c. a share on the common.

This compares with $1,910,428 and $2.08 per common share a year ago.

Forbid Counties in Ohio to Sell Gravel

AUDIT DISCLOSES PRACTICE

Brighter prospects for additional business are assured to the operators of privately-owned sand-and-gravel plants throughout Ohio as a result of orders issued recently by state examiners who have discovered counties—Champaign County in particular—selling gravel from county-owned gravel pits to boards of township trustees and private contractors. The action has been disclosed in a report by state examiners covering a 22-month audit of county offices.

Pointing to an opinion rendered by the attorney general of Ohio in 1930, the examiners forbid continuation of county competition against private gravel pits, saying "the opinion is based upon the reasoning that the statutes do not authorize a county to enter a field of commercial enterprise."

The opinion holds that "neither county surveyors nor county commissioners may legally sell gravel from county pits to township trustees or contractors."

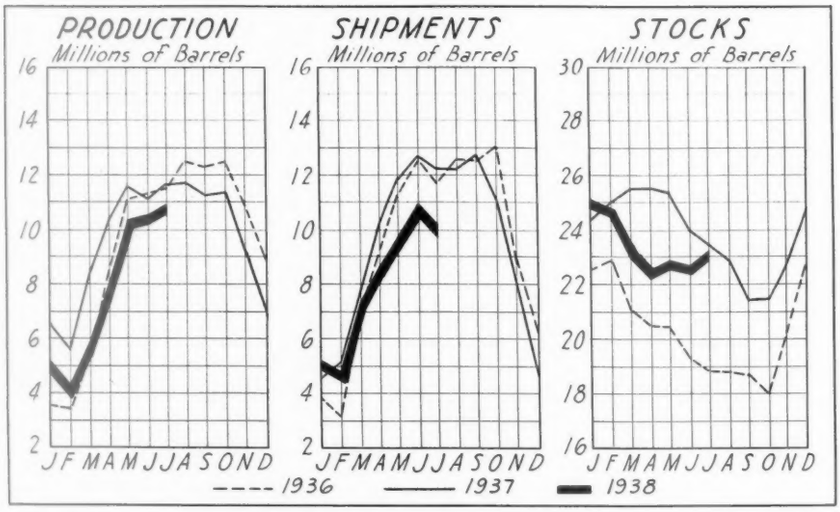
Fire Causes $40,000 Damage in Oregon

Fire caused damage estimated at $40,000 when it visited the quarry plant operated at North Powder, Ore., by the Roy L. Houck Co. of Salem, Ore.

The company had established the quarry and plant to provide aggregates for the rebuilding of the Old Oregon Trail highway and the loss was said to have been partly covered by insurance.

Included in the equipment destroyed was a large compressor, two Diesel power units, an electric-welding outfit and the electric-light plant.

Considerable damage resulted recently when fire attacked the plant of the Watson Gravel & Sand Co. near Amite, La.



The Portland-cement industry in July, 1938, produced 10,967,000 bbl., shipped 10,163,000 bbl. from the mills, and had in stock at the end of the month 23,271,000 bbl., according to the Bureau of Mines. Production and shipments in July, 1938, showed decreases of 5.4 and 16.9 per cent. respectively, as compared with July, 1937. Portland-cement stocks at mills were 0.4 per cent. lower than a year ago. The statistics were compiled from reports for July received by the Bureau of Mines from all manufacturing plants except one for which estimates have been included in lieu of actual returns.

Carney, Jr., to Head Masonry-Cement Firm

H. E. Carney, Jr., has been elected president of the Carney Co., Mankato, Minn., manufacturer of masonry cement, succeeding his father, the late H. E. Carney, who died a short time ago at Pasadena, Cal. Other officers elected for the remainder of the year are W. B. Lee, former treasurer, as secretary and treasurer and general manager; C. J. Jacobson and W. R. Oglesby, chemist, vice-presidents.

Mr. Lee has been associated with the Carney Co. for the past 25 years, having started as a driver and cement tester in 1913. He was later bookkeeper, office manager and treasurer.

Mr. Oglesby started his service with the company in June, 1929, as chemist and still holds that position. He has long been identified with the cement industry in America. He was associated with the Warner Co., Philadelphia, Pa., and later was secretary-treasurer of the Spackman Engineering Co., Philadelphia, one of the largest commercial laboratories in the country. At one time he was chemist for the Wabash Portland Cement Co. and later served as chemist and superintendent for the Hidalgo Cement Co., in Mexico.

Annual Inspection of Cement Laboratories

The Cement Reference Laboratory, a joint project of the National Bureau of Standards and the American Society for Testing Materials and sponsored by Committee C-1 on Cement of the A.S.T.M., is preparing for a sixth inspection tour among cement-testing laboratories. Those laboratories which desire to avail themselves of this inspection service should promptly address their requests therefor to the Cement Reference Laboratory at the National Bureau of Standards. The proposed tour will, in general, provide only one opportunity for the inspection of any laboratory during the next two years. The inspection work is limited to physical tests of cement and does not include the calibration of compression-testing machines.

Coming Events

October 10-11, 1938, Chicago, Ill.—National Safety Congress and Exposition, Stevens Hotel.

November 30-December 2, 1938, Washington, D. C.—Eighteenth annual meeting, Highway Research Board, National Academy of Sciences Bldg.

January 30, 31-February 1, nati, O. — Annual conventions, National Sand & Gravel Assn. and National Ready-Mixed Concrete Assn., Netherland Plaza Hotel.

January 30, 31-February 1, 1938, Cincinnati, O. — Annual convention, National Crushed Stone Assn., Netherland Plaza Hotel.

Offers Free Cement in Promotion Plan

FOR DEMONSTRATION HOUSES

To encourage the building of low-cost homes under $5,000, and preferably at near the $3,000 level, the Marquette Cement Manufacturing Co. is making an unusual offer to its dealers. Marquette dealers building a demonstration home in their communities selling for between $3,000 and $5,000 ($26.30 to $43.87 per month) will be given the necessary amounts of Marquette Portland and masonry cements required for the work absolutely free.

The home can be concrete, concrete block, frame, brick, or brick veneer. It must be built on a guaranteed price contract, within the price range mentioned; it must be advertised as a demonstration home and be open to the public for 30 days after completion; construction must begin before October 1, 1938; and the offer is restricted to dealers who handle Marquette cement and are located within the company's shipping radius. A large display sign, which must be placed at the site, is also furnished free, and will carry the names of individuals, companies and agencies coöperating with the dealer in the erection of the home.

According to W. A. Wecker, president, too many demonstration homes have been built at high price levels, with many expensive frills, and the average person doesn't realize that a good, durable home can be had for the rent he is now paying.

Concrete-Pipe Makers Hold Annual Outing

The Concrete Pipe Manufacturers Assn. of Washington held its annual summer meeting at Cliffdell, Wash., on August 26 and 27. The association took over the cabin camps at "Whistling Jack Lodge," with accommodations for 30 for the gathering. Officers of the group are Hans Mumm of Everett, Wash., president; Earl Bracken of Aberdeen, Wash., vice-president, and W. P. Hews of Yakima, Wash., secretary-treasurer.

Basalt-Rock Concern Launches New Plant

A new aggregates plant costing approximately $35,000 to erect has been completed and placed in operation on the Sacramento River near Redding, Cal., by the Hein Bros. Basalt Rock Co.

The plant is located on a 10-acre deposit with 700 ft. frontage on the river. Mark Hein is president of the concern.

Gypsum Sales Show Only Slight Decline

TREND IS CONTRA-SEASONAL

Although production and sales of gypsum and gypsum products in the April-June period of 1938 averaged about 20 per cent. lower than in the corresponding period of the preceding year, they generally were improved slightly over the like period of 1936. Reports from 48 producing companies to the Bureau of Mines, after adjustment for changes in statistical coverage, indicate an approximately normal seasonal improvement for the second quarter of the current year and a probable reversal of the pronounced downtrend that originated in the third quarter of 1937.

The chief factor in this recovery has been the improvement in building construction. According to Dodge statistics, the dollar volumes of residential and nonresidential building contract awards increased substantially in the second quarter of 1938 and were only 15 and 21 per cent., respectively, below the like 1937 quarter. The improvement started in March and continued through June which showed a higher total dollar volume than any previous month of this year, contrary to the usual seasonal trend. Further gains in residential building are expected in the next quarter as a result of stimulation by the government in its new mortgage-insurance program and the low-cost housing projects.

The apparent supply of crude gypsum in the second quarter and the first half of this year was 20 and 23 per cent. lower than in the corresponding periods of 1937. Calcined gypsum produce declined about one-eighth and one-sixth from like periods of 1937. Sales of uncalcined gypsum, consisting chiefly of Portland-cement retarder, declined approximately one-fourth in the second quarter of 1938 from the same period of last year. Owing to the low level of industrial production, calcined gypsum sales for manufacturing uses during both the first and second quarters of 1938 were only about one-half of those during like periods of 1937.

Appeals Tax Decision on Dismantled Plant

The Consolidated Cement Corp. has appealed a decision of the Allen County (Kansas) equalization board to the Kansas state tax commission protesting the valuation of its Mildred, Kan., plant.

The company operates cement plants at Fredonia and Bonner Springs, and is junking the Mildred plant which has not been in operation for the past ten years.

In 1936 a cut of $108,220 in valuation was approved, bringing the assessed valuation down to $104,000. Another reduction of $29,000 was allowed in 1937, but when the company sought to bring the valuation down to $25,000 this year, the county commissioners, who serve as the Allen county equalization board, refused.

Lone Star Profits in Six Months Decline

Consolidated net profit of the Lone Star Cement Corp. for the second quarter of this year was $797,134 before surtax, or 83 c. a share as against $1,188,733 or $1.23 a share in the same 1937 quarter. Earnings in the second quarter this year were up slightly from the first quarter, when 76 c. per share was earned.

Six months net this year totaled $1,523,371, or $1.59 a share, against $1,924,437, or $1.99 a share, in the first half of 1937.

Employment, Payrolls Show Little Change

According to Isador Lubin, commissioner of labor statistics, U. S. Department of Labor, employment in the cement industry was up 2.1 per cent. in June compared with May. Payrolls, however, dropped 0.8 per cent.

In quarrying and nonmetallic-mineral mining for the same month, employment was down 0.3 per cent. and payrolls were 2.6 per cent. lower.

Pennsylvania Producers Gambol at Harrisburg

The annual picnic and meeting of the Pennsylvania Stone Producers Assn. was held at the Blue Ridge Country Club, Harrisburg, Pa., on August 18.

Following the completion of the business session, members and their guests enjoyed golf and other sports with dinner followed by a floor show in the evening.

Lime Plants in Ontario May Burn Natural Gas

There is a possibility of natural gas being used to burn the lime in the plants located in the Beachville, Ont., area instead of coal.

Colin Hawkins, one of the owners of the gas wells drilled two years ago at Brownsville, a distance of 20 miles from the quarries, is asking the government gas referee to give permission for the extension of the firm's mains to the quarries.

Defer Illinois Annual Minerals Conference

AWAIT BUILDING DEDICATION

The sixth annual Illinois Mineral Industries Conference, previously scheduled to be held at Urbana on September 30 and October 1, has been postponed so as to coincide with the date of dedication of the Natural Resources Building to be constructed soon on the University of Illinois campus.

The State Geological Survey, the College of Engineering, and the Illinois Mineral Industries Committee, sponsors of the conference, have concluded that it will be wise to postpone the meeting until some time in 1939, because of the necessity of concentrating attention on details concerned with the design and plans for the new building. The structure will be erected at a cost of $545,000. Approval of a P.W.A. allotment of $245,000 for the project was recently announced.

18 Tons of Dynamite Detonated in Blast

One of the largest charges of dynamite ever set off in the province of Ontario or possibly Canada, was that set recently at the Havelock Co., quarry, 28 miles east of Peterboro, Ont. The blast loosened 100,000 tons of rock, 18 tons of dynamite being used. The blast was made following several months of tunneling.

Recent Equipment Installations ★ ★ ★

The Washington-Idaho Lime Products Co., Orofino, Ida., is installing a new Williams hammer-mill. . . . *A Koehring excavator has gone into service at the aggregates operations of P. W. Ryan Sons, Janesville, Wis.* . . . A Symons 3-ft. by 10-ft. double-deck vibrating screen and a 300-ft. Barber-Greene conveyor are new equipment at the plant of the J. Frese Sand & Gravel Co., Spokane, Wash.

Butler batching bins have been installed at Okauchee, Wis., by Jaeckle's Concrete Products Co. . . . *Robins Gyrex screens were recently installed by C. W. Blakeslee & Son, New Haven, Conn.; Warren Bros. Roads Co., Boston, Mass.; Thomasville Lime & Stone Co., Thomasville, Pa.; and the Industrial Aggregate Co., Minneapolis, Minn.*

A 20-inch Universal crusher has gone into service on the sand-and-gravel dredge owned by the Grays Harbor Construction Co., Aberdeen, Wash. . . . *A hammermill for producing agricultural stone, supplied by the Lippman Engineer Wks., Milwaukee, was a recent addition at the plant of the Halquist Lannon Stone Co., Sussex, Wis.* . . . Two new G.M.C. trucks have been added to the fleet of the George Scofield Co., Tacoma, Wash., whose ready-mixed-concrete plant, recently damaged by fire, is being rebuilt.

Cement-Price Advance Is Extended in East

ANNOUNCE NEW BASING POINTS

Prices of Portland cement have been advanced between 17 c. and 50 c. a bbl. in the large consuming areas of New York and Boston. The advance is the first important change in quotations in these areas in about 18 months and in large measure offsets the reduction put into effect toward the close of 1936 to meet foreign competition.

In announcing the new prices for these areas, the trade also put into effect somewhat lower quotations in other districts where special conditions prevail.

In New York City and Long Island the advance amounts to 27 c. a bbl. and in northern New Jersey to 17 c. In Boston the increase totals 50 c. a bbl. and scales down to around 10 c. in markets radiating from that city.

Among the districts in which lower prices have been set are the southern part of New Jersey and Philadelphia area, where the reductions are 27 c. a bbl. In the counties of New York State bordering on Pennsylvania, a 10-c. a bbl. reduction has also been put into effect. It is understood that several new basing points have been established in the Pennsylvania area, where competition is keen, and that this was largely the cause of lowering of prices in those districts.

Of the some 20 cement producers in the area in which the changed prices have been announced, 10 or 12 have already published new lists and the remainder are expected to follow shortly.

Exports Help Maintain Phosphate-Rock Output

Midyear reports show a drop of only 4 per cent. in the production and shipment of phosphate rock by American producers. A decline of almost 16 per cent. in apparent consumption in the United States was offset by a substantial recovery in the tonnage exported and, due in part to the fact that the prices on export business are much higher than those on domestic sales, the value of total shipments during the first six months of the current year was a great deal higher than it was during the corresponding period of 1937. The total quantities of phosphate rock sold or used in the United States, as compiled from reports to the Bureau of Mines, was 1,860,787 long tons valued at $6,740,616 during the half year ended June 30, 1938, compared with 1,930,582 tons worth $5,922,332 during the 1937 period. Stocks in producers' hands increased moderately to 1,564,000 tons compared with 1,440,000 tons a year ago.

The 16-per cent. drop in apparent net consumption of phosphate rock compares with a 17-per cent. drop in production and a 13-per cent. decline in shipments of superphosphate during the first five months of the respective years as reported by the Bureau of the Census. The Census data further reveal a more-than-seasonal decline in May, 1938 and for that month alone the shipments were off 21 per cent. compared with May, 1937 and only slightly greater than those for the corresponding 1936 month. Sales to farmers of all kinds of fertilizers dropped only 11 per cent. during the period under review.

The increased exports are mainly the result of much larger shipments to Germany and other European countries as those to Japan, which recently has been the second largest buyer, were somewhat curtailed.

Illinois Gravel Firm Making Concrete Bricks

The Eastwood Sand & Gravel Co., Grayville, Ill., which has also produced concrete products for a number of years, is now turning out Dunbrik.

Both plain and color-glazed units are being produced. R. M. Eastwood, head of the concern, is erecting a new residence which he will occupy, using the material. A combination of light brown with chocolate trim is being employed.

Bomb Causes Damage at Moline Gravel Plant

Nominal damage resulted at the plant of the Milan Sand & Gravel Co., near Moline, Ill., recently when vandals, possibly labor agitators, set off a charge of dynamite. Non-union workers are employed at the plant.

Sections of hoppers were shattered and a 42-ft. cableway mast was displaced by the blast.

Lehigh Starts Work of Rehabilitation at Alsen

The Lehigh Portland Cement Co. has started work toward rehabilitating the plant at Alsen, N. Y. More than 50 men are employed in preparing the plant for the resumption of operations.

The old tramway, formerly used to bring raw material from the quarry to the plant, will be supplanted by another method of transport, it is reported.

Opens Second Ready-Mix Plant at San Mateo

The H. E. Casey Co., San Mateo, Cal., recently opened its second ready-mixed-concrete plant which will serve the San Mateo-Burlingame area.

California Producers Merge Properties

PLAN NEW PLANT AT LINDSAY

The merger of the Grant Service Rock & Gravel Co. with the San Joaquin Valley properties of the Pacific Aggregates, Inc., large northern California rock, gravel and construction concern, in a $500,000 transaction, have been announced by A. R. McMillan, manager of the Grant Service company.

The new firm will be known as the Grant Pacific Rock Co., and headquarters will be maintained in Fresno, Cal. Pacific Aggregates will continue to operate its properties north of the San Joaquin Valley separate from the new corporation.

R. L. Felchin, president of the Grant Service Rock & Gravel Co., is the president of the merged concern.

Properties which will be operated by the Grant Pacific company include crushed-stone and gravel plants at Rockfield, Piedra, Lemon Cove and Lindsay. In addition, retail yards are maintained in Selma and Fresno.

A new plant, capable of handling 2,500 tons of rock and gravel daily is to be installed at Lindsay.

The Grant Pacific company will handle aggregates, cement, building mortar, ready-mixed concrete, road asphalt, road equipment and will also engage in a general contracting business.

Rich Asbestos Deposit Revealed in Far North

Wallace Haviland, formerly a farmer in Delhi, Ont., has staked nearly 2,000 acres of barren land in Northern Ontario, from which particularly rich samples of asbestos have been obtained. Mr. Haviland was searching for a particular kind of gravel when surface drilling brought to view a substance which later was found to be asbestos. The mine which is located 260 miles north of North Bay is the only one found in Ontario, the asbestos used in Canada being obtained almost exclusively from Quebec.

National Gypsum Lets Contract for New Plant

Contract for the new $1,000,000 Savannah, Ga., wall-board plant of the National Gypsum Co. has been awarded to the George A. Fuller Co. of New York City on a fee basis. Work has already started on preliminary dredging and the building of a dock.

Erection of the plant proper is to get under way in September with completion scheduled for the early months of 1939.

Sand, Gravel Output Higher Last Year

TONNAGE UP 6%, VALUE 8%

According to the U. S. Bureau of Mines, the total output of sand and gravel in the United States in 1937 amounted to 189,660,423 tons valued at $97,472,997, an increase of 6 per cent. in tonnage and 8 per cent. in value compared with the 1936 production of 178,329,814 tons valued at $90,307,752, but still substantially less than the 1929 record of 222,571,905 tons worth $132,835,979. Approximately one-third of the material produced last year was removed by contractors and construction or highway maintenance crews employed by Federal, state, county or municipal governments, over half of that used on Federal projects being taken out by W.P.A. crews, according to reports to the Bureau of Mines. In 1929, non-commercial production represented only 7 per cent. of the total output.

Commercial operators reported sales of 125,342,478 tons valued at $79,114,318 in 1937, an increase of 5 per cent. in both tonnage and value over the 1936 production, and a rise in average value of 63 c. a ton compared with 60 c. in 1936. Production of building sand amounted to 26,050,459 tons, resulting in a decrease of 6 per cent. from the 1936 figure of 27,722,960. A decrease of 4 per cent. was shown in the 1937 production of building gravel which amounted to 24,876,957 tons compared with 25,850,985 tons produced in 1936. Washed or screened material amounted to 108,469,032 tons with an average value of 68 c. a ton, and accounted for 87 per cent. of the total commercial production. Methods of transportation were reported by companies accounting for approximately 87 per cent. of the commercial output. Of the 108,976,680 tons thus reported, 48 per cent. was shipped by rail, 39 per cent. by truck, and 13 per cent. by water.

With a total output of 64,317,945 tons valued at 29 c. a ton, noncommercial operations in 1937 showed an increase of 10 per cent. in tonnage over the 1936 figure, due partly to the decided upward trend in production of structural sand and gravel, and a decrease of 6 per cent. in average value. Only 19 per cent. of this material was washed, screened, or otherwise prepared. Sand and gravel produced directly by construction or maintenance crews of states, counties, municipalities and other government agencies amounted to 38,637,673 tons valued at 21 c. a ton, while 25,680,272 tons valued at 40 c. a ton were produced by contractors expressly for the use of such agencies. State highway departments accounted for 54 per cent. of the total output; counties, 32 per cent.; municipalities, 3 per cent., and other agencies 11 per cent.

Sand and gravel sold or used by producers in the United States, 1936-37, by commercial and noncommercial operations and by uses.

	1936		1937	
	Short tons	Value	Short tons	Value
COMMERCIAL OPERATIONS				
Sand:				
Glass	2,394,710	$4,050,749	2,799,230	$4,746,629
Molding	4,210,017	4,072,387	4,953,873	5,239,435
Building	27,722,960	14,968,226	26,050,459	14,809,078
Paving	15,127,684	7,811,192	17,395,013	9,487,817
Grinding and polishing	934,059	1,306,871	1,067,178	1,440,736
Fire or furnace	183,667	201,099	258,287	268,355
Engine	1,576,432	990,816	1,802,869	1,092,171
Filter	72,381	126,248	99,383	182,414
Railroad ballast	1,177,843	300,102	1,418,316	334,585
Other	1,195,523	815,714	1,295,419	1,058,162
Total sand	54,595,276	$34,643,404	57,140,027	$38,659,382
Gravel:				
Building	25,850,985	17,871,961	24,876,957	18,130,011
Paving	27,012,176	16,135,807	30,156,314	17,991,964
Railroad ballast	11,723,535	3,169,961	12,318,575	3,757,068
Other	738,423	411,258	850,605	575,893
Total gravel	65,325,119	$37,588,987	68,202,451	$40,454,936
Total sand and gravel	119,920,395	$72,232,391	125,342,478	$79,114,318
NONCOMMERCIAL OPERATIONS[1]				
Sand:				
Building	810,196	$410,686	1,540,280	$595,953
Paving	4,897,922	872,904	4,704,764	1,157,162
Total sand	5,708,118	$1,283,590	6,245,044	$1,753,115
Gravel:				
Building	1,251,901	$896,454	2,961,360	$1,396,202
Paving	51,449,400	15,895,317	55,111,541	15,209,362
Total gravel	52,701,301	$16,791,771	58,072,901	$16,605,564
Total sand and gravel	58,409,419	$18,075,361	64,317,945	$18,358,679
COMMERCIAL AND NONCOMMERCIAL OPERATIONS				
Sand	60,303,394	$35,926,994	63,385,071	$40,412,497
Gravel	118,026,420	54,380,758	126,275,352	57,060,500
Grand Total	178,329,814	$90,307,752	189,660,423	$97,472,997

[1] By States, counties, municipalities, and other Government agencies directly or under lease.

The Rockwool Co., makers of insulation materials with Canadian plant in Brantford, Ont., has closed its plant in that city and will import wool from United States in future. The building is owned by General Steel Wares, Ltd., London.

Jahncke Service, Inc., New Orleans, La., important producer of aggregates, ready-mixed concrete and lime putty, is also a hydraulic-dredging contractor. Its Diesel dredge "Tchefuncta," shown at the left, above, recently completed excavation of the Neches River Channel Project near Beaumont, Tex. The dredge, built at Jahncke's own shipyards, uses an Amsco 20-in. pump and an Amsco manganese-steel rotary cutter head. The picture at the right shows a general view of the completed Neches River Channel with the floating-pontoon Armco pipe-line from the dredge to the shore position. The picture was taken from the upper deck of the dredge.

Federal Trade Commission Orders Five Concrete-Pipe Firms to Cease Unfair Trade Practices

The Federal Trade Commission has ordered five manufacturers and distributors of concrete pipe and other concrete products to cease and desist from certain unfair acts and practices engaged in pursuant to a conspiracy to eliminate and suppress competition and to drive out competitors in the Eastern seaboard territory where they operate, particularly in Virginia, Maryland and the District of Columbia.

The order is directed against the Arlington Concrete Pipe Corp., South Washington, Va.; Lock Joint Pipe Co., East Orange, N. J.; F. B. and J. H. Gray, trading as The Gray Concrete Pipe Co., Thomasville, N. C.; Mid-Atlantic Concrete Pipe & Products Co., Norfolk, Va.; Concrete Pipe & Products Co., Richmond, Va., and Jack M. and J. Scott Parrish and Harry W. Easterly, owners of all the capital stock of Concrete Pipe & Products Co.

To further the purposes of their conspiracy, the commission found, Arlington Concrete Pipe Corp. was organized in 1934 by the other respondents, who, through stock ownership, dominate and control it, and operate it to drive competition out of Virginia, Maryland and the District of Columbia. According to findings, all the officers and directors of Arlington Concrete Pipe Corp. hold some official position in either one or the other of the other respondent companies as follows:

John E. Johnson is president of both Mid-Atlantic Concrete Pipe & Products Co. and Arlington Concrete Pipe Corp.; H. F. Ahrens is treasurer of both Lock Joint Pipe Co. and Arlington Concrete Pipe Corp.; Jack M. Parrish is president of Concrete Pipe & Products Co. and secretary of Arlington Concrete Pipe Corp. and the directors of Arlington Concrete Pipe Corp. are Johnson, Ahrens, Parrish, and F. B. Gray, a partner in The Gray Concrete Pipe Co., and C. W. Diecks, sales manager of Lock Joint Pipe Co.

Findings are that the respondents do about 40 per cent. of the concrete-pipe business in the Eastern seaboard territory from New Jersey and Pennsylvania south to North Carolina, and approximately 75 per cent. of such business in Virginia, Maryland and the District of Columbia. The commission's conclusions state that the respondents constitute a group so large and influential that they control to a substantial degree the flow of trade in concrete pipe and other concrete products in the territory mentioned.

Unlawful practices which the respondents were found to have employed, and which, under the order, they are prohibited from engaging in by agreement, combination or conspiracy, are the following:

(1) Refusing and failing to submit independent competitive bids to supply concrete pipe and other concrete products to prospective customers.

(2) Selling or submitting bids to supply, either in the name of the Arlington Concrete Pipe Corp. or any other jointly-owned corporation or organization, concrete pipe or other concrete products to prospective customers.

(3) Selling or submitting bids to supply, either in the name of the Arlington Concrete Pipe Corp. or any of the respondents, concrete pipe and other concrete products to prospective customers below production cost.

The complaint in the proceeding charged that the respondents made disparaging statements and representations concerning the financial standing and business of competitors, but the commission found that there was not sufficient competent testimony in the record to sustain such allegation.

Findings of the commission with respect to some of the acts and practices of the respondents are, in part, as follows:

Prior to February 10, 1934, when bids were to be opened on a contract to supply Arlington County, Va., with approximately $300,000 worth of pipe in various sizes, a meeting was held in a Washington hotel, attended by H. F. Ahrens, treasurer of Lock Joint Pipe Co., and a salesman of the same company; one of the partners of Gray Concrete Pipe Co.; John E. Johnson, president of Mid-Atlantic Concrete Pipe & Products Co.; and Jack M. Parrish and Harry W. Easterly, president and vice-president, respectively, of Concrete Pipe & Products Co. At the meeting the invitation to submit bids on the Arlington County job was discussed.

While representatives of the respondents attending the meeting stated they did not reveal to any one present the prices they intended to submit, they admitted discussing what prices their competitors, the vitrified-clay pipe companies, would probably submit with a view to making the price of the several concrete-pipe companies below that of the vitrified clay companies.

After the meeting representatives of Concrete Pipe & Products Co., Mid-Atlantic Concrete Pipe & Products Co. and Lock Joint Pipe Co. revised the figures they had prepared to submit on behalf of their concerns. When the bids were opened, it was found that Concrete Pipe & Products Co. was low bidder on some items, while Lock Joint Pipe Co. was low on others.

In March, 1934, before the contract was awarded and before Arlington Concrete Pipe Corp. was organized, Mr. Johnson, president of the Mid-Atlantic company, which was not low bidder on any item, went to Arlington County to locate a site on which to construct a plant to manufacture the pipe to fill the contract.

The county awarded the contract to the two low bidders on May 16, 1934. On May 22 the Arlington Concrete Pipe Corp. was organized by the other respondents, and the contract which had been awarded to Lock Joint Pipe Co. and Concrete Pipe & Products Co. was assigned by them to the newly-formed and jointly-owned company.

Prior to October, 1935, employees of Arlington Concrete Pipe Corp. were not allowed by the directors to submit specific bids on behalf of their company, but were instructed to promote the sale of concrete pipe generally in Virginia, Maryland and the District of Columbia and to help obtain contracts for the respondents, Gray Concrete Pipe Co. and Concrete Pipe & Products Co. in the territory named. Since then the Arlington corporation, acting under the directions of its directors, has been submitting bids and has been selling concrete pipe supplied by Gray Concrete Pipe Co. The prices at which the Arlington company sells are fixed by officials of the other respondents.

One of the methods employed by the respondent companies to eliminate competitors was to sell concrete pipe below production cost. At various times in 1935, 1936 and 1937 the Arlington company, while subject to the control and management of the other respondents, submitted bids in which prices quoted were below production cost, and in 1936 and 1937 lost $9,000.

The Lock Joint Pipe Co. owns and operates concrete plants at Denver, Chicago, St. Louis, Cleveland, Kenilworth, N. J., White Plains, N. Y., Hartford, Conn., and at several places in South America. The Gray Concrete Pipe Co. has branch plants in Baltimore and Hagerstown, Md., while the Mid-Atlantic Concrete Pipe & Products Co. maintains a branch manufacturing plant at Dover, Del.

New York Operator Orders 69 Trucks with Diesel Power

ALSO CONVERTS 40 OLD UNITS

Typical of the trend in the non-metallic-minerals field toward the Dieselization of equipment and notable for the size of the order placed is the recently-announced purchase by the Colonial Sand & Stone Co., New York, N. Y., of 69 new Mack trucks powered by Cummins 6-cyl. Diesel engines.

The Diesel engines were produced by the Cummins Engine Co. at its plant at Columbus, Ind., while the trucks were built and assembled at the Mack factory at Allentown, Pa.

In addition, the Colonial company has a program under way which is converting 40 or 50 of its existing gasoline-engine trucks into Cummins Diesel-powered equipment. When completed, together with the delivery of the new trucks, the company will have 110 or 120 Diesel-powered trucks in its fleet representing an investment of approximately $1,000,000. "We decided on using Diesels after careful trials," explains Frank B. Carbone, secretary of the Colonial concern. "Our records show a definite saving on the consumption of fuel as well as an increase in efficiency of deliveries owing to greater speed and more power with Diesel equipment."

Forty-five of the new trucks will be of 14-cu.yd. capacity, 5 will be 16-cu. yd. six-wheelers and 19 will be in chassis form to carry concrete-mixing bodies. Thirteen brand new 5-cu. yd. Transit Mixers and six older Transit Mixers which have seen some service will be mounted on these 19 chassis.

Up to two years ago, Diesel-powered dump trucks were a comparatively new field for the Diesel engine. Operators had contended that because of the short hauls usually made, Diesel power would not be economical in proportion to its records on high-speed, interstate freight transfer. However, experiments made by the Colonial company and other concerns in metropolitan New York and contractors on large dam jobs covering periods of a few months to two years proved the practicability and economy of the Diesel engine for short-haul work.

Changing one of Colonial's dump trucks over to Diesel power.

Diesel engine installed in a ready-mixed-concrete truck has shown a fuel saving of one-third compared with gasoline.

The Cummins Engine Co., a pioneer builder of Diesel engines, is now operating on the largest production schedule in its history and is carrying on an extensive expansion program. Additions to two of the present buildings are being constructed and work on a new factory building, strictly modern, in which nothing but the Cummins Diesel fuel system will be manufactured is scheduled to start immediately.

P. E. Letsinger, vice-president in charge of sales, states that the company plans to double its present production during the next year. This will be due to a new, smaller Diesel engine built in 4- and 6-cylinder sizes (4-in. bore and 5-in. stroke) which has just started to come off the line. A further improvement in the fuel system eliminates objectionable smoke and odors which will make the Diesel engine practical for city buses operating in heavy traffic. It is said that at a small cost the improved fuel system can be adapted to all Cummins Diesels now in service.

The company has operated at near capacity for the past six years, and the present expansion program is its fifth during this time.

Texas Sands Utilized in New Type of Road

The recent development of a high type of cement-sand stabilized road, produced by mixing cement with the fine sea sand of the dunes which extend inland about 50 miles into Southwest Texas from the Gulf of Mexico is being put to practical use.

The first section of roadway upon which this type of construction is being used is near Sarita, Tex., on the "Hug-the-Coast" Highway.

In construction, the sandy roadbed is first scraped and smoothed. Cement is then spread to a depth of about 2 inches. It is then cut into and mixed with the sand by a rotary-type disking machine, water being added at the same time. A steel blade next smooths the surface and is followed by a heavy road-roller which compacts and levels the material to form the riding surface.

The mixture is about 90 per cent. sand and 10 per cent. cement. The construction cost per mile of the new process is said to be in the neighborhood of $8,000 compared with $13,000 to $18,000 for black-topped caliche-base roads.

New Cement Plant Being Built in South Africa

A cement plant is being built in Port Shepstone, on the south coast of Natal, South Africa with a capital expenditure of $1,750,000, according to a report to the U. S. Bureau of Foreign and Domestic Commerce from the office of the American commercial attache at Johannesburg.

EDITORIAL

Classes Beget Clashes

IT WAS one of the hopes of the writers of the Declaration of Independence and of the framers of the Constitution that it was possible to create in America what the world had until that time not yet seen, a nation wherein equality of status, equality of rights, equality of responsibilities, and equality of opportunity should not only be accepted as fundamental principles of government and economic organization but should actually be the standards and tests by which individual conduct should be appraised and rewarded. All revolutionaries expect to attain objectives similarly fantastic and all express their aspirations in similar high-sounding language. Bills of rights, declarations of the dignity of human nature, manifestoes of one kind and another are the safety valves through which really oppressed or merely self-pitying groups find expression for their discontent. They picture—always in general and more or less ambiguous terms—a flawless Utopia, in which they visualize each man seeking his own happiness with a high regard for the like ambitions of his fellows and with scrupulous avoidance of any act of hindrance, suppression, coercion or intimidation that might to the smallest degree infringe upon their God-given right to strive for a sane, decent and healthy life. By stating the doctrine of human equality in forceful terms it was believed that a society, free from the class distinctions, hatreds and struggles that had darkened and bloodied the lives of countless generations of the past, could be set up in this nearly-virgin continent and that here, if anywhere, could be realized all the dreams of man's well-wishers.

Enunciation of the doctrine displayed a beguiling *naïveté* that still brings the flush of hopeful longing to the cheek of the average American. Even mature men, tried in the hard school of experience and themselves witnesses of the great changes that have occurred in but a single generation in the extent to which practice has differed from profession, still speak in glowing words of the society that gives living proof of the natural equality of man, that has conquered the old world tendency to set men apart in classes marked by racial, social, religious, physical, psychic and economic differences, that has stayed the hand of the aggressor and supported and comforted the oppressed. Even astute business men, whose areas of activity are delimited by the aggressions of competitors, whose ambitions are thwarted by the demands of workers, consumers and other pressure groups—men, in short, who have every reason to be aware of the existence of class interests, class aspirations, and class conflicts—decry the activities and utterances of those who would, as they express it, "set class against class" and "stir the muddy waters of class hatred". They are loath to face the truth that no working or workable form of society without stratification along class lines exists or, probably, can exist, where the very conditions which create class differences are present in such number and variety as in this industrial age.

The wealth of opportunity that enables a man to rise or fall from one social class to another—the social mobility that has reached its fullest development in this country—is constantly at work changing his interests, his attitudes, his desires, duties and responsibilities, making for him new friends and new enemies. A worker in the automobile industry, for example, may be opposed to his employer on questions of hours and wages but may support him in his pleas for more and better roads. In the one case he thinks and acts as the member of a horizontal class; in the second he feels himself a part of a vertical, industrial class. In the former situation he may look up to those who earn more and down upon those who earn less than he; in the latter situation he may be bitterly opposed to all those who seek to obtain public funds for other than highway-building purposes.

The employee who, with the savings of years, enters the retail food business, let us suppose, begins to lose interest in his former advocacy of stricter food laws and gradually comes to look upon legislation of that kind as improper interference by government in the field of private enterprise. From an employee who may always have tried to work as little as possible, he is suddenly transformed into an employer who may try to pay as little as possible. His former gratitude for free public concerts may change just as quickly into resentment of the fact that he, now a business man able to patronize regularly the paid-admittance concerts of his local symphony orchestra, is forced to support by taxation a form of aesthetic entertainment and education that should be open only to those who can afford to pay for it.

A MEMBER of a craft-type labor union finds himself swept into membership in an industrial union by changes in circumstances. His new alliance changes his loyalties, and the craft-type becomes as hateful to him as the industrial type was formerly. An unskilled laborer rises to the rank and pay of a skilled workman. His interests are no longer those of his former underpaid co-workers, but those of his better-paid skilled comrades; he and the members of his family move in different circles, patronize new stores, attend a different church, adopt new life habits. He has lost

his interest in improving the lot of the unskilled, because the limited opportunities and insufficient earnings of the latter no longer oppress him.

These are some of the seemingly trivial factors that favor the growth of classes with conflicting class interests. In a society such as ours, wherein it is easier to move from one class to another than in other parts of the world, it is to be expected that class distinctions would be less important and class rivalries less bitter. It is on that account more difficult in this country to raise labor agitation to the level of a political movement hostile to the government and to society. The widespread availability of economic opportunity tends to weaken the border lines of classes that are marked at best by social or political distinctions.

NEVERTHELESS, all the experiences that contribute to the development of class consciousness are present in our industrial life. They result from it and, in their turn, shape its future trend, and their influence increases as their number grows. The sentiments that draw together people who feel that they have common interests, even though often vague and indefinable, are not for that reason without the power to arouse feelings of class consciousness. The desire to improve one's economic position, to rise in the social scale, to win the respect and, possibly, even the envy of those who formerly stood above one or on one's own level, to look down upon the less fortunate ones below, all have a share in causing and increasing social and industrial unrest. The sense of solidarity that grows out of a consciousness of a community of interest based on similarity of occupation, similarity of income, similarity of social position, similarity of restrictions on mobility from one class to another, similarity of sufferings, disabilities, lack of opportunity, and the like, is a factor of great power and significance in modern life and it inspires confidence and a feeling of strength in those who share it. Business men in their trade associations, professional men in their societies, religious persons in their churches, boys and girls in their clubs and secret societies, workers in their labor unions, hoodlums and criminals in their gangs—all these and many other types of individuals experience the force of attraction that springs from a realization of the commonness of their aspirations and obstacles.

After this realization comes the desire to test that solidarity. It is not enough to know that they have common interests. They soon discover that they have common opponents, common difficulties, that stand in the way of their march toward their objectives. In upholding what they conceive to be their own rights they naturally and inevitably run against the assertiveness, the acquisitiveness, the possessiveness of other groups or classes, and at that point their interests clash, and controversy, that may end in conflict, results.

It is almost inconceivable that any person can in any way avoid the adoption, knowingly or involuntarily, of class attitudes. The very avoidance of alliance with known groups or classes may in effect place one in another group of nonconformists or noncoöperators, that is perhaps, it is true, not quite so easily identified or recognized, but no less real. Stock brokers, theater ushers, stamp collectors, marathon dancers are members of classes to the same extent as are bricklayers, employers, free-traders, doctors, farmers, or cement manufacturers. Each group has a desire to widen the area of its operations, to preserve what it has acquired, to add to its possessions and prestige, and to oppose any other group that threatens its security, imperils its future, or opposes the attainment of its ends. The areas of operation are always in a state of flux, sometimes impinging on others, sometimes overlapping others, rarely harmonizing with others, but always providing causes of disagreement, controversy, and mutual exclusion or extinction. Where there are classes, there will be clashes.

Classes, class consciousness and class struggles emerge from the field of purely academic interest only when they transgress established rights. Quarrels between rival philatelic societies may be of little public interest, but conflicts between the advocates of group medicine as opposed to private medicine, between employers and employees, between competitive labor organizations, are matters of wide concern for their effects cut deeply into the fabric of national economic and social life. Such strife may be very costly in life, money, happiness, lost opportunity, and wasted effort.

IT is futile to attempt the suppression of classes. They are the unavoidable results of economic, social, political and emotional causes. If the disastrous effects of the conflicts that continually and inevitably arise between them are to be reduced or avoided, some attention must be given to the conditions that promote the origin and growth of classes and class distinctions. The founders of this nation thought they had accomplished that desirable end when they proclaimed the doctrine of equality. But modern social scientists seriously doubt whether a classless society is a possibility, even here.

To most of us the elimination of class conflicts seems to be a socially desirable end. We deplore the inconvenience and costliness of social strife, but usually only when its burdens fall on us as individuals, for after all most of us still look upon our liberties more as personal privileges than as rights to be shared by all. Yet our first task is really the softening of those conditions, such as certain social and economic inequalities and injustices, that foster the growth of class consciousness and class antagonisms. Much could be done toward the reduction and, possibly, the elimination of these social sores and, through that accomplishment, toward the attainment of more peaceful living, but more is required than the unaided efforts of sociologists and political scientists. Active study and coöperation by intelligent business men is badly needed.

By **HERBERT F. GOUGH**
Tennessee Valley Authority

Siliceous Aggregate Makes Control of Dust Necessary at Hiwassee Dam

A general view of operations at T.V.A.'s Hiwassee Dam in North Carolina.

THE Tennessee Valley Authority has begun the placement of concrete at Hiwassee Dam, the 320-ft.-high storage project now under construction across the Hiwassee River in Cherokee County, North Carolina.

The Hiwassee Dam is T.V.A.'s second high tributary storage project, and the sixth dam to be erected in fulfillment of its plan for the integrated control of the Tennessee River system. The dam will create a deep mountain lake some 10 sq. mi. in area. Located, as it will be, in a section where the rainfall ranges from 45 to 75 in. a year, the controlled flood storage capacity of about 360,000 acre-ft. provided by this new reservoir will have considerable bearing upon the regulation of the Tennessee River for navigation and flood control. The average flow of the Hiwassee at the dam site is 2,100 c.f.s., though a flow of 42,000 c.f.s. has been recorded.

The site is in an extremely rugged section of the southern Appalachian Mountains, wherein the predominating geologic formation is greywacke. It is this greywacke rock that creates both the outstanding characteristic and the outstanding problem at the Hiwassee job. Almost seamless, so hard that it can scratch glass, this grey rock provides a perfect foundation for the 775,000 cu. yd. of concrete that will go into the dam. It is not a widely-known rock, its only *local* in the United States being the mountains at the southern end of the Tennessee-North Carolina state line.

Greywacke is a mixture of quartz, feldspar, and mica, with quartz predominating. It is sometimes called arkose, the two rocks being almost identical in appearance and characteristics, and may be called metamorphosed sandstone. The rock at the dam site not only forms an excellent foundation, but extensive tests have proved it to be satisfactory for aggregate as well. It breaks down into very good coarse and fine rock, and tests indicate that it makes better sand than any that could be shipped in from near sources. In spite of these advantages, the Authority faces at Hiwassee Dam a serious problem in its construction program—that of dust control. The greywacke rock contains an average of about 70 per cent. of free silica, the basic cause of silicosis. Further, due to its abrasiveness, this free silica (present in the form of quartz) presents a problem in the process of reducing it to sand. It is interesting to note, however, that in spite of the abrasiveness of the material, and the fact that ordinarily hammer-mills are considered unsuitable for abrasive feeds, the hammer-mills at Hiwassee are being operated successfully.

The Authority's manner of handling this material, therefore, makes the quarry and aggregates plant at Hiwassee one of the most interesting it has yet developed.

As it is possible to prevent the occurrence of silicosis the Authority has instituted two types of control at the Hiwassee project, one utilizing medical diagnostic procedures, the other applying engineering methods. In both the Authority has had the advantages of consultation with members of the staff of the Industrial Hygiene Division of the United States Public Health Service. Also, Theodore Hatch, assistant dust-control engineer, Industrial Hygiene Division, New York State Department of Labor, a recognized authority in matters of dust control, was

employed as a consultant. As may be expected, therefore, from quarry to concrete mixer, dust control is in evidence every step of the way at the Hiwassee construction plant.

The quarry is on the right bank of the river, 2,500 ft. downstream from the foundation of the dam. Its 760-ft. long face, rising quickly from elevation 1,500 to elevation 1,670, has been sluiced clean of overburden. On December 16, 1937, wagon-drills were put to work and 250 ft. of the face was opened.

The general plan for operating the quarry calls for the preliminary use of wagon-drills to establish a face for well-drills. The well-drilling will penetrate clear to the base at each operation, working back into the hill 18 ft. at a time, until ultimately the holes are about 165 ft. deep. All the drilling is done wet.

In the preliminary work four Chicago-Pneumatic G-100 wagon-drills were used. In the well-drilling one Keystone model No. 84 and two Bucyrus-Armstrong model 29T units, operating on skids and boring 6-in. or 9-in. holes, are used. Six Ingersoll-Rand S-49 and S-68 jack-hammers do the secondary drilling. In the well-drilling the Authority is trying out an explosive having an ammonium-nitrate rather than a nitro-glycerine base. It is estimated that the average monthly production at the quarry will be 60,000 tons, the daily operation being on a two 8-hr.-shift basis.

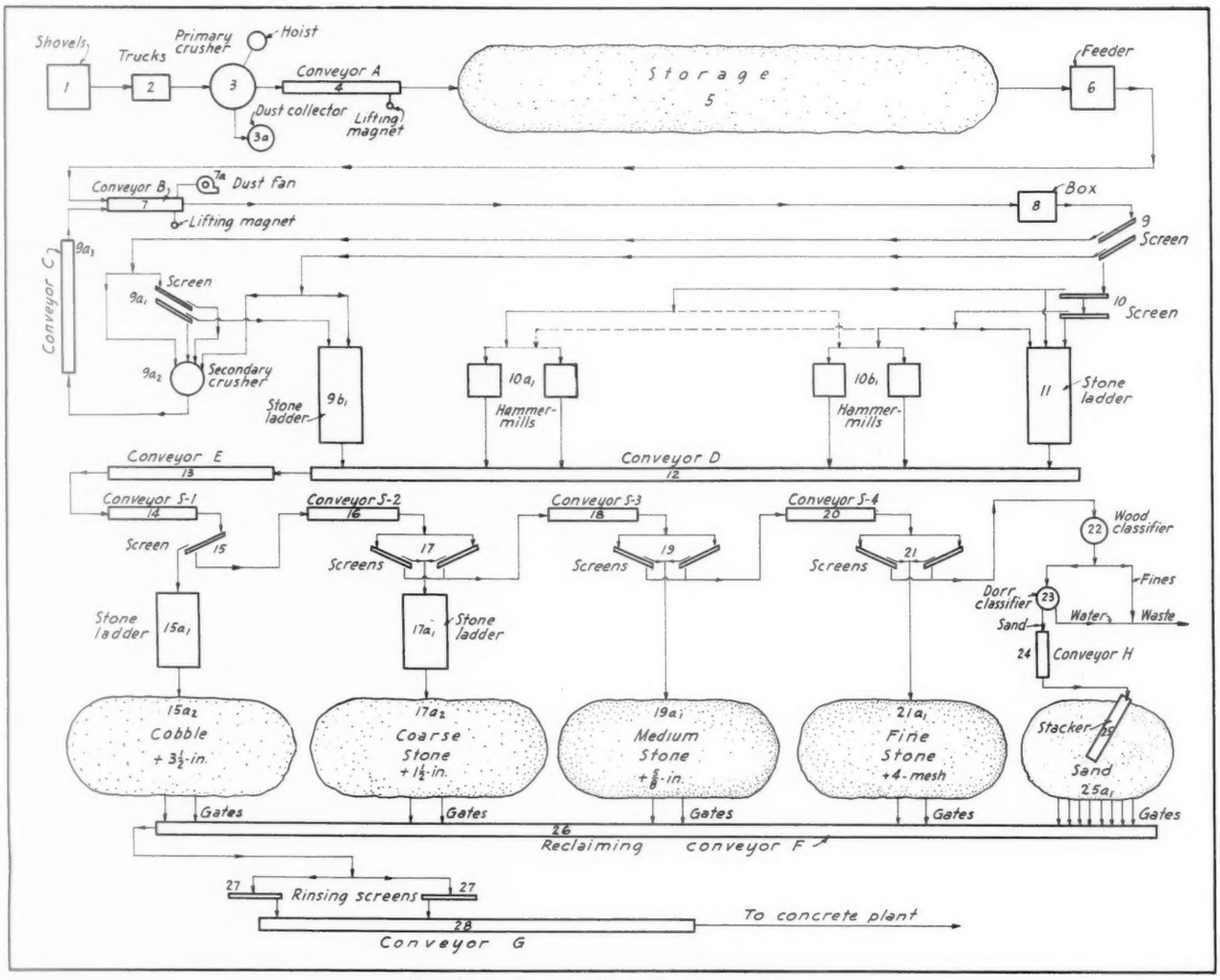
Belt-conveyor system running from the crusher building to the aggregates-sizing bridge.

Two Bucyrus-Erie 75B power shovels, one 2½-cu.yd., the other, 3-cu.yd. capacity, load the rock into four Hug Boulder type 12-cu.yd. dump trucks. Between 1,500,000 and 2,000,000 tons of rock will be moved by these units.

As the trucks discharge into the primary crusher, their loads are sprayed with water forced through a long perforated pipe. The crusher is the same Allis-Chalmers 42-in. Superior-McCully gyratory unit formerly used by the Authority at Norris and Chickamauga dams. It has an operating capacity of 475 tons per hr. at a 4¾-in. setting open side.

The discharge from the primary crusher is hooded, and the dust is evacuated by a fan and trapped in a Schneible dust-collector, where it is sprayed and washed away. The fan at the dust-collector operates at 5,000 cu. ft. per min. If it stops, a signal horn blows automatically.

Quarry view showing the drills, primary crusher, shovels, trucks and part of Conveyor A.



Flow-sheet of aggregate-production operations.

A Barber-Greene 42-in. belt-conveyor (A) carries the rock away from the crusher upstream toward the dam, a distance of 367 ft. If this flight of conveyor stops operating, the primary crusher automatically stops. The belt used was supplied by the Quaker City Rubber Co. A 150-hp. Westinghouse motor operates the conveyor at a speed of 406 ft. per min., giving a capacity of 800 tons per hr. The flight is inclined and discharges on the primary storage pile. A Cutler-Hammer lifting magnet removes tramp iron.

The primary storage pile has a live capacity of about 5,000 tons within a total of 15,000 tons. Beneath the pile is a 7-ft. by 7-ft. concrete reclaiming tunnel extending about 90 ft. to the edge of the stock-pile. Through this tunnel runs the 36-in. belt-conveyor system (B) that transfers the material from the stock-pile to the top of the crusher building. A Jeffrey-Traylor magnetic vibrating feeder discharges the rock on the belt-conveyor.

The reclaiming tunnel is exhausted of dust at the loading end of the belt by means of a fan operating at 6,000 cu. ft. per min. The dust leaves the tunnel through a 20-in. steel pipe inside a 24-in. culvert pipe, which carries it some distance away to a point where no men will be working. A horn signal system is installed at this point also. If either the feeder or the belt starts without the fan being set in operation, the horn immediately sounds a warning.

The second flight of belt-conveyor (B) is of Robins make and is 452 ft. long. It supports a 36-in. Quaker City rubber belt, and is powered by a 100-hp. Westinghouse motor. This flight has a capacity of 600 tons per hr. and operates at a speed of 402 ft. per min.

The crusher building is the most air-tight unit in the entire aggregates-handling plant. Here the most dust will be created and consequently unusual precautions are taken for control at this point.

The crusher building produces all five sizes of aggregate used on the job: —6-in. to +3½-in.; —3½-in. to +1½-in.; —1½-in. to +⅝-in.; —⅝-in. to +No. 4-mesh; and —No. 4-mesh to and including No. 200-mesh.

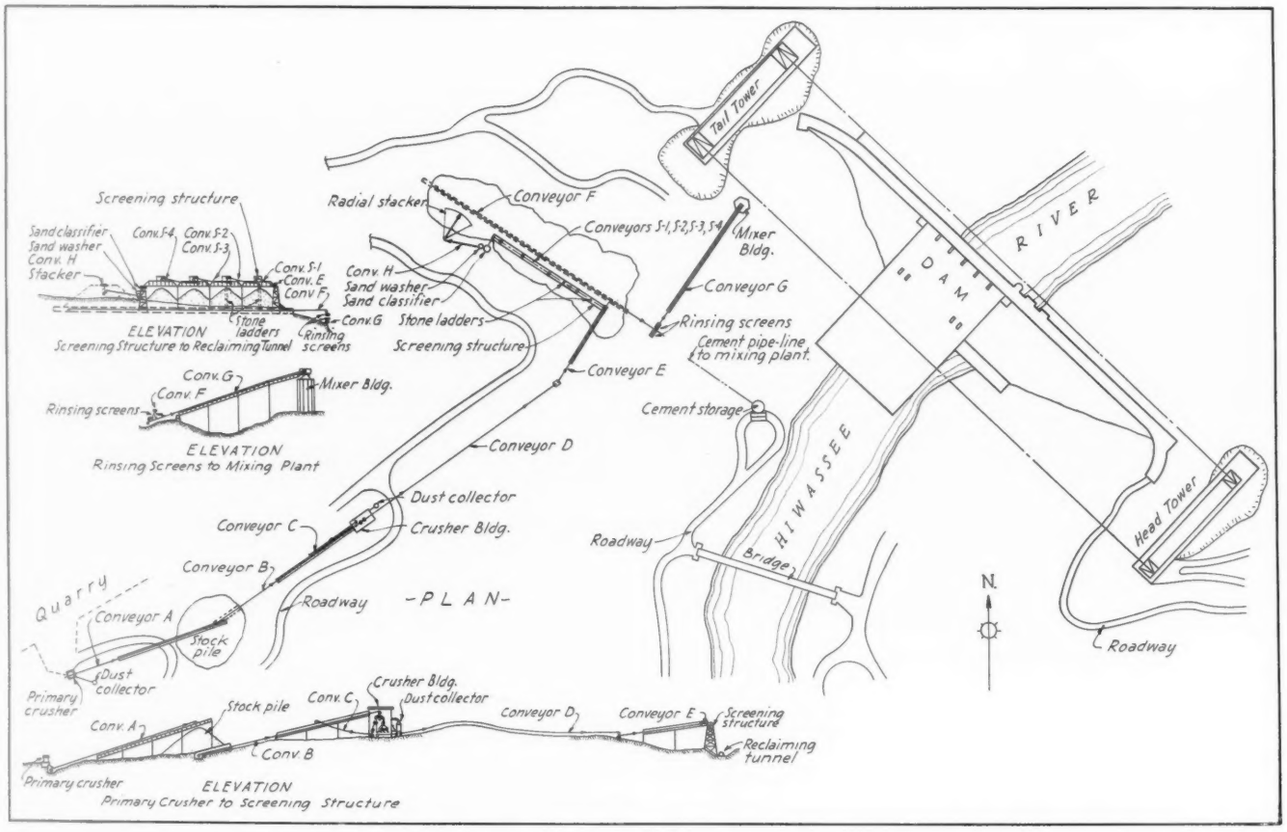
The rock from the primary storage pile enters the top of the crusher building and is discharged into an inclosed box, whence it passes a horizontal double-deck screen. The first deck passes everything but the +3½-in. rock. This is diverted and split, half of it going direct to the Symons secondary cone crusher for further reduction, the other half being directed to a second horizontal double-deck screen. This second double-deck screen removes first the +6-in., which also goes to the Symons crusher, and, second, the +4-in., which drops down a stone ladder to the belt-conveyor leading to the sizing plant. The residue which passes through the second double-deck screen is chuted to the Symons crusher. In other words, half of the original +3-in. rock goes direct to the Symons crusher, then the +6-in., then the —4-in. The —6-in. to +4-in. goes to the sizing plant.

To return now to the first double-deck screen on the top of the crusher building. The second deck of this unit screens out the —3½-in. to +1½-in.

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE CRUSHED-STONE PLANT OF THE TENNESSEE VALLEY AUTHORITY, HIWASSEE DAM, N. C.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key	Equipment	Make	Description	Motors
Excavating, loading and hauling		Wagon-drills (4)	Chicago Pneumatic	Model G100, 3-wheeled, wet drilling	
		Wagon-drills (2)	Bucyrus-Armstrong	Model 29-T on skids	
		Well-drill	Keystone	Model 84 on skids	
		Jack-hammers (6)	Ingersoll-Rand	Models S49, S68, wet drilling	
	1	Shovels (2)	Bucyrus-Erie	Model 75-B, 1 ½-cu. yd., drag-line attachment	
			Bucyrus-Erie	Model 75-B, 3-cu. yd.	
	2	Trucks (4)	Hug	Model 99S Boulder type, 12-cu. yd. dump bodies	
Primary crushing, storing and conveying	3	Primary crusher	Allis-Chalmers	42-in. Superior-McCully gyratory, 475 t.p.h. at 4¾ in.	250-hp. G.E. slip-ring
		Hoist	Ingersoll-Rand	2,000-lb. Tugger	7 ½-hp. G.E.
	3a	Dust-collector	Schneible		
	4	Conveyor (A)	Barber-Greene	366-ft. centers, Quaker City 42-in.belt	150-hp. Westinghouse
		Lifting magnet	Cutler-Hammer	39-in. diam., 85-amp.; Burke generator	10-hp. G.E.
	5	Storage pile		5,000 tons "live" within 15,000 tons total	
	6	Feeder	Jeffrey-Traylor	36-in. by 66-in. electric vibrating	
		(From 6 and $9a_2$)			
	7	Tunnel conveyor (B)	Robins	452-ft. centers, Quaker City 36-in. belt	100-hp. Westinghouse
		Lifting magnet	Cutler-Hammer	27-in. diam., 85-amp.; Burke generator	10-hp. G.E.
	7a	Dust fan	American Blower		
First screening	8	Box			
	9	Screen	Robins	Gyrex, 4-ft. by 8 ½-ft. 2-deck	7 ½-hp. Century
		(Oversize split to $9a_1$ and $9a_3$; intermediate split to $9a_2$ and $9b_1$; fines to 10)			
	10	Screen	Allis-Chalmers	Low-Head, 5-ft. by 12-ft., 2-deck	25-hp. Allis-Chalmers
		(Oversize to $10a_1$ or $10b_1$; intermediate to $10b_1$ or $10a_1$; fines to 11)			
	11	Stone ladder			
		(From $9b_1$ $10a_1$, $10b_1$ and 11)			
	12	Conveyor (D)	Barber-Greene	611-ft. centers, Manhattan and Goodrich 30-in. belt	60-hp. Westinghouse gear-reducer
	13	Conveyor (E)	Robins	277-ft. centers, Goodrich 30-in. belt	40-hp. Westinghouse gear-reducer
		(To 14)			
Secondary crushing and conveying		(From 9)			
	$9a_1$	Screen	Allis-Chalmers	Vibrating	15-hp. Allis-Chalmers
		(From 9 and $9a_1$)			
	$9a_2$	Secondary crusher	Symons	5 ½-ft. standard cone with fine bowl	200-hp. G.E.
	$9a_3$	Conveyor (C)	Stephens-Adamson	147-ft. centers, Goodyear 24-in. belt	15-hp. Century gear-reducer
		(To 7)			
		(From 9)			
	$9b_1$	Stone ladder			
		(To 12)			
Pulverizing for stone sand		(From 10)			
	$10a_1$	Hammer-mills (2)	Pennsylvania	42-in. by 48-in.	250-hp. Allis-Chalmers (2) direct-connected
		(To 12)			
		(From 10)			
	$10b_1$	Hammer-mills (2)	Allis-Chalmers	4A Pulverators	250-hp. Allis-Chalmers (2) belt-driven
		(To 12)			
		Hoist	Wright	5T, high-speed, chain, hand-power	
Sizing		(From 13)			
	14	Conveyor (S-1)	Robins	43-ft. centers, Hewitt 30-in. belt	20-hp. G.E. gear-reducer
	15	Screen	Niagara	4-ft. by 14-ft., 1-deck	5-hp. Century
		(Oversize to $15a_1$; throughs to 16)			
	16	Conveyor (S-2)	Stephens-Adamson	81-ft. centers, Goodyear 30-in. belt	25-hp. Westinghouse
	17	Screens (2)	Kennedy-Van Saun	4-ft. by 8-ft., 1-deck	5-hp. G.E. (2)
		(Oversize to $17a_1$; throughs to 18)			
	18	Conveyor (S-3)	Barber-Greene	92-ft. centers, Goodrich 24-in. belt	15-hp. Westinghouse gear-head
	19	Screens (2)	Jeffrey-Traylor	42-in. by 96-in. and 47-in. by 88-in. magnetic vibrating	5-hp. (2)
		(Oversize to $19a_1$; throughs to 20)			
	20	Conveyor (S-4)	Barber-Greene	91-ft. centers, Goodrich 24-in. belt	15-hp. Westinghouse gear-head
	21	Screens (2)	Nordberg	Symons 4-ft. by 10-ft., 1-deck	
		(Oversize to $21a_1$; throughs to 22)			
	22	Classifier	Nordberg	Wood Auto-Vortex, bowl	1 ½-hp. Louis Allis
		(Coarse to 23; fines to waste)			
	23	Classifier	Dorr	Bowl	10-hp. G.E.
		(Sand to 24; water to 22; fines to waste)			
	24	Conveyor (H)	Stephens-Adamson	98-ft. centers, Goodyear 24-in. belt	10-hp.
	25	Stacker (I)	Barber-Greene	87-ft. centers, Goodrich 24-in. belt	
		(To $25a_1$)			
Conveying and storing		(From 15)			
	$15a_1$	Stone ladder			
	$15a_2$	Cobble (+3 ½-in.) storage			
		(To 26)			
		(From 17)			
	$17a_1$	Stone ladder			
	$17a_2$	Coarse-stone (+1 ½-in.) storage			
		(To 26)			
		(From 19)			
	$19a_1$	Medium-stone (+⅝-in.) storage			
		(To 26)			
		(From 21)			
	$21a_1$	Fine-stone (+4-mesh) storage			
		(To 26)			
		(From 25)			
	$25a_1$	Sand storage			
		(To 26)			
Washing and conveying to concrete plant		(From $15a_2$, $17a_2$, $19a_1$, $21a_1$, and $25a_1$)			
	26	Conveyor (F)	Barber-Greene	645-ft. centers, Goodrich 24-in. belt	25-hp. Westinghouse gear-head
		Fan			
	27	Rinsing screens (2)	Allis-Chalmers	4-ft. by 14-ft., 1-deck	7 ½-hp. Allis-Chalmers (2)
	28	Conveyor (G)	Barber-Greene	395-ft. centers, 24-in. belt	60-hp. Westinghouse gear-head
		(To concrete plant)			



Plan and elevations in relation to the dam site and river.

rock. This, too, is split, half going direct to the secondary crusher, the other half going down the same stone ladder as the —6-in. to +4-in. rock to be carried away to the sizing plant.

The Symons secondary crusher, then, receives its material from four sources. Its product is discharged on a 24-in. Stephens-Adamson belt-conveyor which extends back 147 ft. toward the primary storage pile and transfers its load to the larger conveyor system operating between the storage pile and the top of the crusher building. In this fashion the stone that had been diverted to the secondary crusher is restored to the regular flow of material through the system.

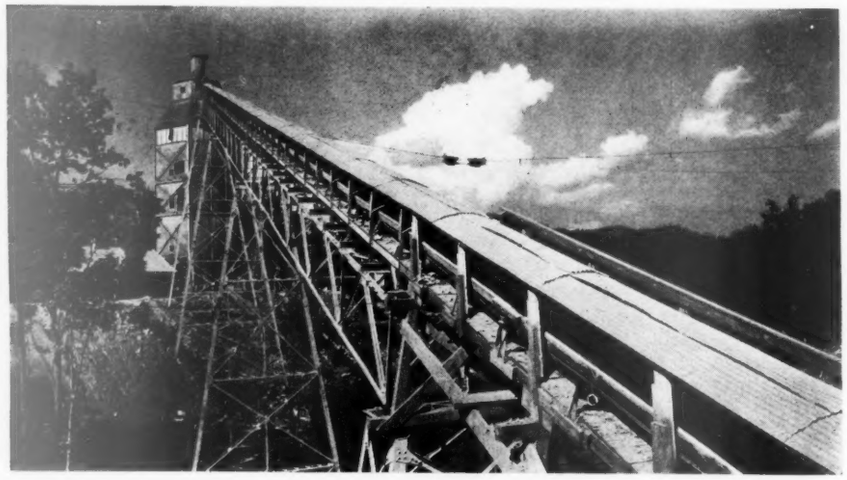
The smaller material that passes the first double-deck screen on the top of the building goes immediately to another double-deck unit. The top deck of this unit removes the +⅝-in. to —1½-in. stone. This, like the previously screened sizes, is split two ways, a little over half going to the hammer-mills to be cracked down to sand, the remainder being chuted to a second stone ladder discharging on the belt-conveyor leading to the sizing plant.

The lower deck of this third screening unit takes out the —⅝-in. to +No. 4-mesh. This, too, is split, the major part of it going to the hammer-mills, the remainder, about 28 per cent., going to the second stone ladder and thence to the sizing plant.

The residue of —No. 4-mesh material which passes this final double-deck unit is chuted directly to the second stone ladder for removal to the sizing plant.

Two Allis-Chalmers Pulverators and two Pennsylvania hammer-mills make up the sand-manufacturing unit. Split gates in the chutes make it possible to divert the material from either deck of the third double-deck screen to either pair of sand mills. And in the chute leading to each pair of mills is another split gate controlling the diversion of material to either mill. The sand produced by the mills is discharged on the conveyor leading to the sizing plant.

Although approximately one-half of the +3½-in. rock is diverted direct to the secondary crusher, it should be emphasized that the split can be made in any proportion desired. This also applies to the other sizes; *i.e.*, —3½-in. +1½-in., —1½-in. +⅝-in., —⅝-in. +4-mesh, and —4-mesh. By being



Conveyor G running from rinsing screens to the concrete-mixing plant.

Completed dust-collector installation at the crusher building.

able to take any amount of any one size and crush it to smaller sizes in any one of three machines—the secondary crusher, the Pennsylvania hammer-mills, and the Allis-Chalmers hammer-mills—it is possible to control absolutely the amounts of each size going to the sizing screens. Even if the proportion of aggregate used in the concrete should change, the right amounts can always be made.

The gradation of the sand itself is

Electro-magnet for removing tramp iron suspended over Conveyor A.

controlled by the fact that two types of hammer-mills are used; coarse-grinding and fine-grinding. The gradation of the sand can be changed by changing the proportions in which the feed is split between the two types of mills. The gradation of the sand can be further controlled by changing the speed of the coarse-grinding mill.

Dust control in the crusher building is extensive. The three double-deck screening units are inclosed in an air-tight compartment. All the discharge points from the secondary crusher, the hammer-mills, and the chute system, including the belt-conveyor as it leaves the building, are also inclosed in air-tight compartments. All these inclosed points are exhausted of dust by a Schneible dust-collecting system, inside which the dust is sprayed and washed away through a long pipe that leads down to the river. In addition, at all points where the belt leading to the sizing plant is being fed, a spray of water is applied to the material, just enough to make the dust adhere to the aggregates.

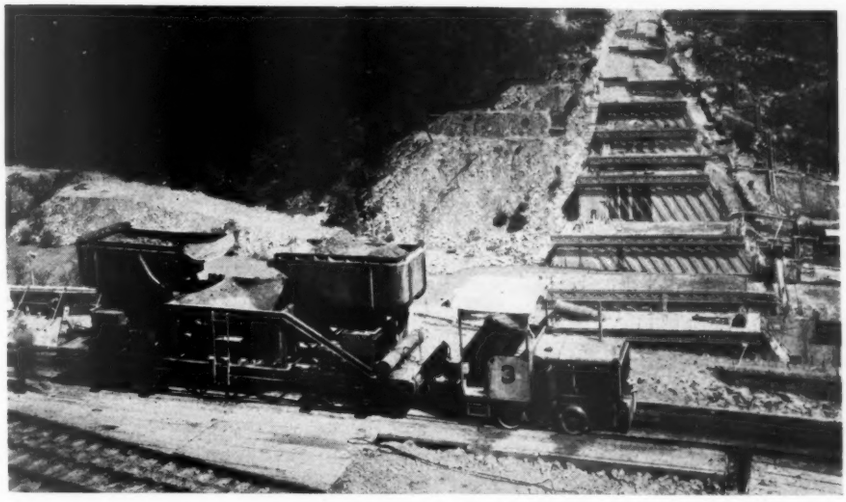
Operation of the 40-hp. fan in the Schneible dust-collector is coördinated with that of all the equipment in the crusher building. For example, if for any reason the double-deck screen which feeds the secondary crusher begins operating and the exhaust fan has not been turned on, a large gong will ring out a warning, and keep ringing until the fan is set in operation. This warning will also sound if the fan stops running while the plant is in operation.

The 30-in. Barber-Greene belt-conveyor carrying the aggregates away from the crusher building extends 611 ft. upstream to discharge on an inclined 30-in. Robins conveyor, which bridges the remaining 227 ft. to reach the screening structure of the aggregates-sizing plant. The longer belt is of Manhattan and Goodrich make and is powered by a Westinghouse 60-hp. motor to operate at 319 ft. per min. carrying 400 tons per hr. The shorter belt is a Goodrich and operates at 342 ft. per min., carrying 400 tons per hr. It is powered by a Westinghouse 30-hp. motor.

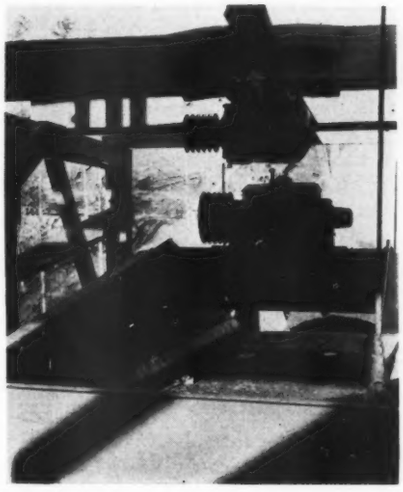
The screening-bridge structure of the aggregates-sizing plant extends 331 ft. abruptly at right angles to the general line of material movement. It is tucked away in a small draw immediately downstream from the north abutment of the dam. The screening bridge, the same as that used at Norris Dam, is 332 ft. long. It consists of four spans, which are of equal length, and support the conveying and screening equipment required to classify the four sizes of coarse aggregate.

The first conveyor on the screening bridge is a 30-in. Robins. It carries the unclassified material 44 ft. to a Niagara 4-ft. by 14-ft. vibrating screen, which removes the cobbles. These pass down to the stock-pile immediately below the bridge by means of a stone ladder.

A 30-in. Stephens-Adamson 81-ft. long conveying unit picks up what has passed the first screen and discharges it on two Kennedy Van-Saun 4-ft. by 8-ft. vibrating screens. These pass everything but the coarse gravel, which drops down a stone ladder to form a stock-pile immediately below.



One of the three special cars which discharge concrete into the cableway bucket.



One of the two vibrating screens at the rinsing plant.

A view of the screening bridge, sand classifier and radial stacker.

The third conveyor is a 24-in. Barber-Greene, 92 ft. long, which discharges on two Jeffrey magnetic vibrating screens, one 42 in. by 96 in., the other 47 in. by 88 in. These units remove the medium gravel, which forms the third stock-pile in the line beneath the screening bridge.

The fourth conveyor also is a 24-in. Barber-Greene unit, 92 ft. long. It discharges on a 4-ft. by 10-ft. Symons double-deck screen, which removes the fine gravel and drops it to the fourth stock-pile underneath the screening bridge.

Water applied to the —4-mesh material that passes this last screening unit washes it down an iron flume to a Woods Auto-Vortex bowl sand classifier, which removes the excess —100-mesh.

The classified sand passes to a Dorr dewatering unit located immediately adjacent. The water removed from the sand in this operation is used to carry away as waste the fines from the Woods classifier. The product from the Dorr unit is deposited upon a flight of 24-in. Stephens-Adamson belt-conveyor and carried 98 ft. to a Barber-Greene radial stacker. The stacker carries a 24-in. belt on an 88-ft. boom.

To insure safety and smooth operations the equipment throughout the entire length of the sizing plant, inclusive of the conevyor system leading from the crusher building, is equipped with interlocked wiring connections. These connections are so arranged that if any motor is stopped purposely or by mechanical or electrical failure, all the equipment suppyling material to that unit will stop also. Moreover, all the equipment carrying material away from the unit that has ceased to function will continue to operate. This interlocking arrangement exists also in the crusher building and its conevyor system leading from the primary storage pile. Still farther back the primary crusher and its flight of conveyor leading to the primary storage pile are also so interconnected, it, too, being a separate group of equipment.

Three units form exceptions to this interlocking arrangement: the secondary crusher and hammer-mills in the crusher building, and the sand classifier and washer equipment at the far end of the storage system. These units are unaffected by the motor interlocks, except that if they themselves should fail to operate, the equipment supplying material to them will stop.

The advantages of this interlocking arrangement are obvious. In the event of trouble it is immediately apparent which motor in the series is causing it. This reduces maintenance time and cost. Continued operation of the units beyond the point of trouble until they unload themselves reduces the amount of electric power required to start the system operating again. On the other hand, if for any reason the operation of a particular unit alone is desired, the interlock switch can be set for manual operation.

Light signals from station to station along the entire system indicate when certain equipment has started operating. For example, when the hammer-mill operator signals for material, a green light flashes on at the signal station for the other operators. Only two of the hammer-mills are operated at a time, one from each pair, and the Allis-Chalmers is set at a faster speed than the Pennsylvania. This is in order to get the proper mixture of sand. If proper operating conditions exist, both mills must be running and their discharge gates open. Any change in this condition turns off the lamp and sounds a warning horn.

The resultant stock-piles from the screening bridge and sand-stacker lie in a straight line beneath the bridge. Underneath the stock-piles is a laminated-wood reclaiming tunnel, 600 ft. long and 6 ft. wide inside. Owing to the moisture in the aggregates, the tunnel is tarred without and sprayed with creosote within. Sixteen gates in the roof of the tunnel allow the passage of material through to the reclaiming belt-conveyor. The piles of cobbles, coarse rock, medium rock, and fine rock have two gates each. The sand stock-pile has eight gates. Within the tunnel at the sand end a 42-in. propeller-type Claridge fan, operating at 6,000 cu. ft. per min. directs a current of air throughout the length of the tunnel.

Before dumping into the primary crusher, the 12-cu.yd. loads from the quarry are sprayed to control dust.

The reclaiming belt-conveyor is a Barber-Greene unit, 645½ ft. long carrying a 24-in. Goodrich belt. It is operated by a Westinghouse 25-hp. motor at a speed of 340 ft. per min. to carry 320 tons per hr. The conveyor unit extends 84½ ft. beyond the mouth of the tunnel to reach a pair of Allis-Chalmers 4-ft. by 14-ft. single-deck horizontal vibrating screens. These screens form a rinsing unit, where wa-

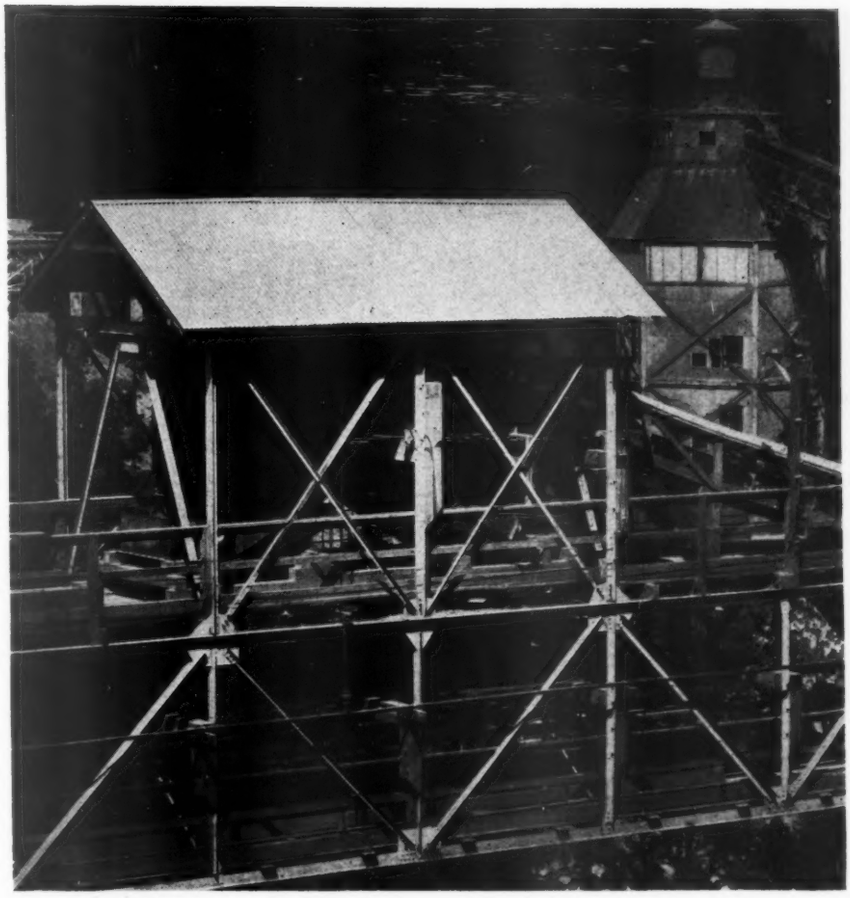
ter is applied to the aggregate to remove the coating of dust that still adheres to it. These screens, instead of being meshed, have 5/32-in. slots and 3/16-in. punched holes to facilitate dewatering from the rinsing process. The sand, of course, by-passes this treatment.

A final inclined conveyor unit, a 24-in. Barber-Greene, carries the material 395 ft. across the draw and up to the headhouse on the top of the concrete-mixing plant.

About 770,000 bbl. of cement will be needed for Hiwassee Dam. The cement requirements for Hiwassee form a part of the blanket contract which the Authority has effected with a number of local cement manufacturers to fill the cement needs on several T.V.A. construction projects. The following firms will fill the Hiwassee needs: Cumberland Portland Cement Co., Cowan, Tenn., 15 per cent.; Volunteer Portland Cement Co., Knoxville, Tenn., 25 per cent.; Signal Mountain Portland Co., Chattanooga, Tenn., 20 per cent.; Penn-Dixie Portland Cement Corp., Richard City, Tenn., 25 per cent.; and Lehigh Portland Cement Co., Boyles, Ala., 15 per cent.

Cement for use in Hiwassee Dam will be modified Portland cement of the same general specifications as that used on other T.V.A. projects, but a "Hiwassee summer cement" of slightly different composition and physical properties, especially suited to conditions at the job, will also be used. The heat characteristics of the cement will be moderate to low—perhaps 75 to 80 cal. per g. at 28 days for the modified Portland and 60 to 70 for the "Hiwassee summer cement".

The cement arrives at Turtletown, Tenn., over the Louisville & Nashville R. R. in bulk in ordinary box-cars. These are unloaded by two 6-in. Fuller-Kinyon portable cement pumps into a steel silo of 4,000-bbl. capacity. It is transferred the 12 mi. from this receiving point to the dam site over a T.V.A. access highway by a fleet of 4 International tractor-trucks hauling 65-bbl. Fruehauf aluminum tank trailers and 1 Autocar.



Two of the seven vibrating screens located on the sizing bridge.

At the dam site the cement is pumped into a 6,000-bbl. steel elevated silo located on the north bank of the river at the foot of the slope on which the aggregates-rinsing unit is located. The cement is discharged by gravity from this storage silo into a Robinson air-activated blower system. The blower system consists of two 55-bbl. tanks which fill and discharge alternately every 5 min. The blower system "shoots" the cement through a pipe leading up the hill to the rinsing screens and thence along the bridge which carries the final conveyor system to the concrete-mixing plant.

Lights in the reclaiming tunnel under each type of aggregate are the means whereby the operator in the headhouse of the concrete-mixing plant indicates the kind of material required. He communicates with the cement-blower plant by means of a horn signal system.

The concrete-mixing plant is a hexagonal steel building 110 ft. high. It was largely fabricated and equipped throughout by C. S. Johnson Co.

The six aggregate bins at the top of the mixing plant have a total capacity of 750 cu.yd. The two cement bins hold 750 bbl. A manually-operated turnhead diverts the discharge of aggregates from the conveyor belt into the appropriate bin.

The aggregate bins discharge by gravity into the weigh-batchers on the floor below. The aggregate batchers are charged by manual operation of the

Conveyor A leading up to the primary storage pile.

The crusher building showing the dust-collecting system being installed.

controls governing the radial gates on the bins. The batcher hoppers for the sand, and fine, medium, and coarse rock are of 22-cu. ft. capacity and are equipped with 3,000-lb. capacity springless dial scales. The cement hopper is also 22 cu. ft., but the scale is of 2,000-lb. capacity. The hopper for the cobbles is of 50-cu. ft. capacity. The water is measured by an automatic weigh batcher. All the scales use Kron spring-

Screens and chutes in the crusher building.

less dials, except for the cement batcher, which uses Toledo scales.

An automatic turnhead controlled by the mixer operator below directs the flow of material from the batchers into the proper mixer. The three 3-cu.yd. T. L. Smith double-cone, air-tilting mixers, driven by 40-hp. Louis Allis motors, are arranged about a central chute on the mixing platform below. The mixing cycle takes 3 min., including loading and discharge. The mixing itself takes between 2 and 2½ min.

Batching and mixing operations in the concrete plant are coördinated by electric-light signal systems, and the operator in charge of the entire plant is in telephone communication with a man at the forms to receive orders when to start or stop operations and what particular mix is required.

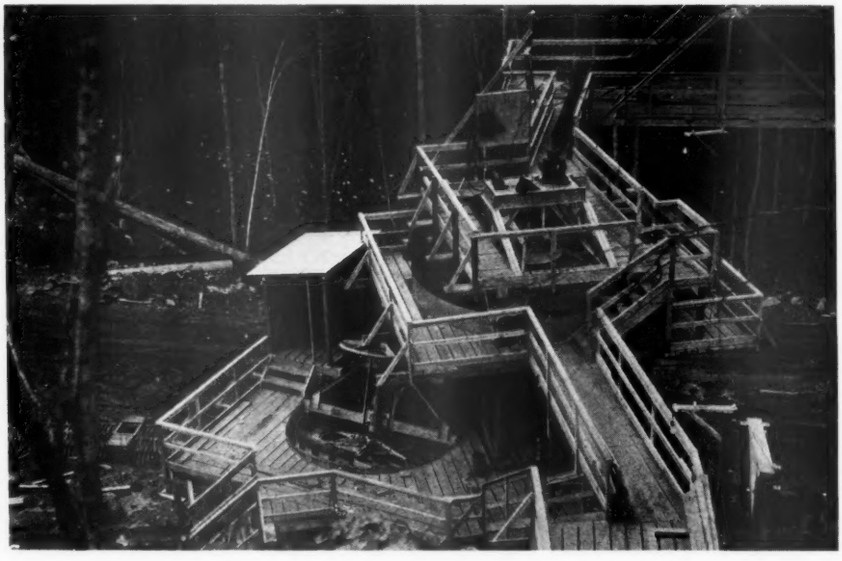
The mixers discharge through the central chute into Insley concrete cars. There are three of these, each carrying two 5-cu.yd. tilting pans, and they are drawn by Plymouth gas-electric locomotives. The concrete cars operate back and forth across the face of the north abutment on a loading platform of timber construction. The tilting pans discharge the concrete out of a side chute attached to the car into a cableway bucket, which swings out on the cableway over the gorge and is lowered to the forms several hundred feet below.

The concrete buckets vary in capacity from a 3-cu.yd. hand-operated bottom-dump Dravo to 7½-cu.yd. square bottom-dump air-operated Insleys.

The cableway is one of the Lidgerwood units used by the Authority at Norris Dam. The 75-ft. head tower operates on a bench at elevation 1,620 on the south abutment. The 110-ft. tail tower operates on a similar bench at elevation 1,548 on the north abutment. They support a 3-in. track cable 1,578 ft. long. The largest buckets weigh 4¼ tons empty and 18½ tons loaded. The distance from the track cable to the lowest point of excavation is 383 ft.

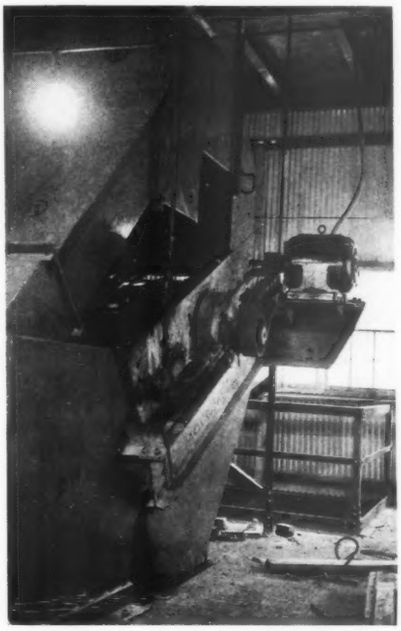
To determine the extent to which present methods of constructing dams produce structures that will function as designed, and to add to the general knowledge of gravity dams, various physical measurements will be made both during construction and after completion. Conditions in the interior of the concrete will be investigated by stress meters, strain meters, joint meters, and hydrostatic-pressure indicators. Uplift pressures will be measured at the foundation joint, and deflections will be measured by plumb wires suspended in small shafts extending vertically from the foundation.

Diversion of the Hiwassee River during the construction of the dam will be accomplished by a sequence of three cofferdams. The first, now completed, extends outward to midstream from the south bank. The second will extend outward from the north bank and tie in



Looking down on the sand classifiers which adjoin the screening bridge.

with the upstream face of one of the blocks in the power-house section and the downstream end of the concrete training wall which is to separate the power-house tailrace and the spillway stilling pool. The river during this stage will be diverted through the two penstock blocks of the power-house section, which will provide an opening 100 ft. wide. In the third stage the upstream ends of these penstock blocks



Screen being installed in the crusher building.

will be closed and the downstream end of the tailrace training wall will be tied in to the south bank. Thus, the river will be forced through the three spillway blocks in Cofferdam No. 2 alternately by a large closure gate until the water is raised to the entrance of the four 8½-ft. regulating conduits that will be located through the lower portion of the spillway blocks.

About 1,100 men are building Hiwassee Dam. The medical method of controlling silicosis on the job is concerned with the selection of these employees, particularly those having to do with dusty occupations. Medical control implies also continued supervision of their health by periodic examinations as long as these employees are exposed to silicosis-producing dusts.

This is accomplished by a specialized preëmployment physical examination which includes, in addition to the usual examination, an analysis of the applicant's previous occupational experience and an X-ray examination of the chest. Applicants who show any significant susceptibility to silicosis at this examination are not recommended for employment in dusty occupations. If, however, their general health is good, they are recommended for work in non-dusty occupations.

Men who are accepted for work are classified according to a special system and are reëxamined at periodic intervals, depending on their classification. Employees who are apparently perfectly normal and show no susceptibility are examined and X-rayed at yearly intervals; and those showing slight or questionable suscepibility, or who have worked in dusty occupations for considerable periods before being employed at Hiwassee, are examined at intervals of six months. A few employees are examined at more frequent intervals.

The last annual examination of employees was made in August, 1937. Up to that time 530 men had been given this industrial-hygiene examination. Of this number 22, or 4.1 per cent., had not been recommended for dusty work, but were recommended for non-dusty work. At the time of the survey, 12 of these men were still employed in non-dusty jobs. Reëxamination of those employed in dusty occupations has in no case indicated any harmful effect from the dust.

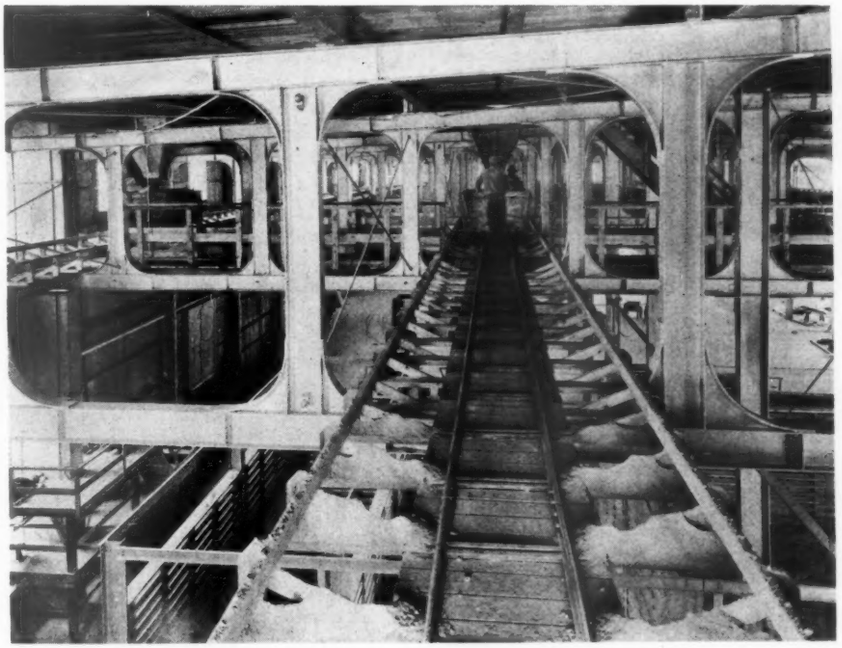
In immediate charge of the Hiwassee project are C. E. Blee, project engineer; Olaf Laurgaard, construction engineer; and James E. Walters, construction superintendent. Theodore B. Parker, chief engineer for the Authority, has direct charge of all T.V.A. engineering and construction, and C. A. Bock is the Authority's chief consulting engineer.

Crushed-Stone Output Shows Slight Gain

The total output of crushed and broken stone in the United States in 1937 amounted to 131,262,010 short tons valued at $121,880,591, an increase of one per cent. in quantity and 3 per cent. in value over 1936, Bureau of Mines figures show. This does not, however, include stone used in the manufacture of lime or cement, asphaltic stone, or slate used for granules or flour, which would increase the total to nearly 170,000,000 tons.

Over 67 per cent. of the crushed or broken stone reported in 1937 was for concrete aggregates and railroad ballast —88,432,570 tons valued at $82,824,608. About 30 per cent. of the concrete and road-making aggregates is noncommercial, produced by contractors or crews maintained by various governmental agencies. There was an increase of 8 per cent. in commercial production and a decrease of 12 per cent. in noncommercial production of these aggregates in 1937, as compared with 1936. The average unit value of the commercial product decreased 5 c. a ton.

In 1937 about 61 per cent. of the commercial aggregates was reported as transported by truck; 26 per cent. by railroads; 9 per cent. by water; and the remainder unspecified. The corresponding figures for 1936 were truck, 57 per cent.; railroad, 30 per cent.; and water, 7 per cent.



Industrial cars roll right through the portal trusses in this modern, mechanized fertilizer plant where the International Agricultural Corp. has placed in operation a completely coördinated unit that turns out a large variety of fertilizers with systematic precision. It is the first commercial application of this all-welded, rigid-frame truss, designed by the Austin Co., which also built this plant in Chicago Heights, Ill. Operators in the pit-and-quarry industries will be interested in this installation and its possible application to processing plants in their own fields of endeavor.

Producers Express Opinions of New Fair Labor Standards Act

With the effective date of "The Fair Labor Standards Act of 1938" less than two months away employers in all lines of industry are becoming increasingly concerned about the possible effects of its enforcement on their businesses. Responding to an invitation from PIT AND QUARRY'S Directing Editor, both large and small producers in the nonmetallic-mineral industries have freely expressed their views on the law's adequacy and practicability and the difficulties that may be expected to follow its application.

Merely as suggested topics for discussion the following questions were asked:

1. Do you think the 25c an hr. minimum is too high or too low?

2. Do you think the 44-hr. week is too short or too long?

3. How will they affect your company, if at all?

4. Do you think these wage-and-hour restrictions should be applied to employers who are actually engaged in interstate commerce and not to their competitors who may sell only within their home state? In other words, do you think the applicability of the law's provisions to any given employer should be determined by the nature of his business (interstate or intrastate), or should this determination be made for an entire industry?

5. Do you think that exemptions from the minimum-wage provisions should be made in favor of certain geographical areas, because of low-wage standards prevailing there, lower living costs, or for other reasons?

6. Do you think that this law—assuming strict enforcement and a reasonably high percentage of compliance—will raise the income and purchasing power of workers who are now paid less than the law's minimum?

7. Do you believe that the operation of this law will improve employer-employee relations by (for example) weakening the hold of labor unions on their members, or making workers less discontented with their economic position, or narrowing the range within which hours and wages can be the subjects of labor disputes, etc.?

8. What, if any, actual practical difficulties do you expect to encounter as results of this law's enforcement?

Some of the replies are published on these pages; others will appear in the October number. To enable the writers to express themselves without restraint they have been promised anonymity in the publication of their opinions.—DIRECTING EDITOR.

I DO not believe that, broadly speaking, anyone can quarrel much with the 25c. per hr. minimum, although it will probably mean increases in certain industries in the South. However, I do not believe there should be any minimum or maximum applied to wages. In times of depression many people are willing to work for a very low wage rather than to have no work at all, and they should be permitted to do so, as it might contribute to more prompt emergence from the depression. The minimum rate will affect our company not at all.

I do not believe in limiting the workweek by legislation, as I feel about the same as I do in regard to a minimum wage. An ambitious workman can work 48 or even 54 hr. a week without hurting himself. To restrict the hours is to restrict initiative and progress. However, the limitation affects us not at all.

While opposed in principle to the idea, yet, since the law has been passed, I would favor the application of the wage-and-hour restrictions to both intrastate and interstate business, although as a matter of principle in government, I think the determination should be left to the state and not be imposed by the Federal government.

If the law is to be kept on the books, I think exemptions in favor of certain geographical areas, as well as country and small town areas as compared with urban centers, should be made.

The income and purchasing power of workers who are now paid less than the proposed minimum would, of course, be raised. However, there is something to be said for the point of view that, if he must pay a certain wage, the employer will seek the most efficient workman obtainable at that wage and the poorer workman would be out of a job entirely, so that such latter individual would be injured, not helped, by the law.

I presume employees whose income is raised would be less discontented with their economic position, which would tend to weaken the hold of labor unions on their members by narrowing the range within which hours and wages could be the subject of labor disputes, etc. It is hard to tell what the reaction of such a weakening hold would have upon the leaders of labor unions. I believe they would continue, as in the past, to demand higher wages and fewer hours regardless of the justification of these demands or their effect upon the economic condition of the country, or upon the real interests of the employees themselves. It should be borne in mind that a very large percentage of labor disputes are stirred up by professional labor-union men, by creating strife and discontent, to justify their own existence, whereas the employees themselves would otherwise have little or no complaint and, if any, it could be more easily adjusted and with less loss to both employer and employee without such outside interference.

The law will create very little, if any, difficulty in our own company as we see it now, but in some industries old wage structures would be deranged. As I see it, governmental compulsion in such matters is unsound and destructive.

(Cement—Illinois)

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THE law's wage minimum is not too high for this locality and probably not too high for the whole country. It will have no effect whatever on our business.

The 44-hr. week is O. K. in most lines, but too short for seasonal businesses like our own, which do not operate more than 8 or 9 months. It may cause us to pay some overtime during rush periods.

It would be a better arrangement to have these restrictions apply to an entire industry instead of only to producers engaged in interstate commerce. We do not understand, however, just how the Federal law can be enforced in the case of a small concern operating wholly within one state. Under the N.R.A. we found that it was impossible to control small producers within a state and have them conform to the code which was supposed to be backed up by Federal law.

I do not see how the states in the far south with lower living costs can maintain their proportional business volume without some exception in their favor.

I do not think this law will help very much to improve the condition of those now paid less than the minimum. While some may be benefited, others may lose their jobs. I also expect that attempting to raise the minimum will increase the use of labor-saving machines wherever possible—even faster than its normal increase in recent years.

I think employer-employee relations may be improved a little by weakening the hold of labor unions on their members, etc.

I expect the attempt to enforce this law will result in most concerns observing the law while having to compete with some minority of firms who will attempt to evade the law by false duplicate pay-rolls and other devices hid-

den in such a way as to be almost impossible of detection.

I think sooner or later some "floor under wages and some ceiling over hours" was bound to come, and I presume this experiment may be as good a way as any to have the whole development start. I am inclined to think it will not affect the larger and stronger industrial units so much as it will many smaller and weaker units who have been able to compete thus far in favored localities by paying slightly less for their labor or working them for a little more time per week.

(Crushed stone—Connecticut)

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THE minimum-wage rate is too low. It will not affect our company because our minimum is about double what the law requires.

A 44-hr. week in our industry is too short for summer months. It will necessitate putting on a second shift during the summer months and our records for the past five years show that we would not have enough business for continuous operation of two shifts.

We think the wage-and-hour restrictions should be applied to employers in both interstate business and intrastate business.

I do not think there should be any exemptions from the minimum wage, because the minimum wage as provided by the law is too low.

It will reduce the income of our employees as well as reduce their purchasing power.

It will not improve employer-employee relations. It will strengthen the hold of unions on their members because their average earnings will be reduced and they will seek a way through the unions to put their earnings back to where they were.

In our territory the competition from wayside pits is severe. These pits as a rule do not handle interstate business and, as they will not come under the law, it will be impossible for us to increase the wages to the men due to this competition. The result will be that our employees will be dissatisfied and their efficiency will be lowered. It is impossible to raise the wages due to this competition. Our company has made increases twice during the last two years due to the increased cost of living.

It has been impossible for us to make any money under present conditions, and with the present wage-hour law as it stands it looks as if it will be disastrous to our company.

(Sand and gravel—Indiana)

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THE minimum-wage provision is too low and the 44-hr. week is too short for a seasonal business. The minimum wage will not affect our company, but the maximum may raise hell in rush times.

The law should be applied to the industry as a whole, and exemptions should be made on account of different standards in different parts of the country.

We do not think the purchasing power will be increased, nor do we believe that employer-employee relations will be improved. The labor unions will take all the credit.

It is too soon to predict what, if any, practical difficulties we will encounter.

(Sand and gravel—Illinois)

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THE 25 c. rate is satisfactory to us, as our minimum is 56 c. It will probably help to hold back demands for a higher minimum.

The 44-hr. week is too short. It should be 48 hr., because it will force us to add a man or two or make us increase our present hourly capacity.

The law's provisions should cover everyone regardless of where his business is producing. There should be no exemptions from its provisions.

The law will weed out slow workers, and will not improve the relations between employers and employees.

(Lime—Ohio)

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THE 25 c. an hr. law is O. K., likewise the 44-hr. week. Neither will affect our company. The applicability of the law to different employers should not be determined by peculiarities of his business, nor should any exemptions be made in certain geographical areas for any reason.

The law will increase the purchasing power of the workers, but will not improve the relations between employers and employees. The reductions of hours below 44 might be inconvenient during peak periods.

(Rock salt—New York)

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THE minimum wage rate will not affect us at all, as it is too low. The 40-hr. a week regulation will affect us seriously, as it is too short. It should be 48 hr.

The law's provisions should be applied uniformly over an entire industry, whether it is interstate or intrastate.

Whether the law will improve the purchasing power of workers is doubtful because of the hourly restrictions.

I think it will improve the relations between employers and employees.

There are many problems to be faced, and only time will tell what these may be.

(Crushed stone—Missouri)

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WE do not think this particular law will affect our own operations to any great extent. As to the 25 c. an hr. minimum, we believe this scale is considerably too low for most industries. It is the expressed opinion in this territory that 25 c. is hardly a just wage for any man to work for and try to support a family.

We can understand, however, where a 25 c. an hr. minimum may work to the advantage of the employee. By this we mean that in certain geographical locations living standards are considerably lower than they are in the West. It would be the opinion of our own company that the wage scale of all industries should be increased if possible to the point where the minimum wage would give a man a chance to make a decent living.

There are some industries which are naturally capable of paying higher wage rates than others. In this particular instance the minimum wage as set forth in the law would in no way affect our own company, as we have established the 50 c. an hr. minimum with our own operations. This minimum wage has been in effect with us for about eight years.

The 44-hr. week would not affect us to any great extent, as we are able to stagger labor based on either a short or a long week. We have found while operating under W.P.A. contracts that by the addition of one or two men for certain operations a short minimum week can be worked out very easily. On the other hand, if there are no restrictions as to the number of hours a man can work per week, there is no trouble encountered there. We are of the opinion that in most instances a 44-hr. week is very little trouble and is one that most industries could enforce without much difficulty. In many instances it would give employees a chance to utilize a little spare time.

At present our employees are getting in anywhere from 40 to 55 hr. a week. This naturally is based on the amount of work available from day to day. Our men rather like to work long hours, especially when they are being paid on an hourly rate. Also our operating season here is comparatively short. From six to seven months a year is about all we can figure on for actual operation. Because of this our employees like to work as many hours as is consistent with health, and in turn so long as the men are not overworked we are glad to extend their weekly time to 55 hr.

We do not think there should be any particular exemptions made to any great extent in favor of some employers, regardless of their geographical location. If it is impossible for the industry to pay a minimum wage of 25 c. an hr., then it is our opinion that the industry should cease to operate in that particular locality. There could be a lot

of criticism raised toward this viewpoint, but the idea we have is that regardless of living standards, costs of living, and so on, no industry should penalize its labor forces to the point where labor can not reap a respectable living and existence.

So far as this particular law is concerned, we can see no reason why it should hurt the labor unions to any great extent. The enforcement of the law may provide a little better means of arbitration and relations between employer and employee. Inasmuch as the minimum is set so low and so far below any recognized union scale of wages, there should be no weakening of union relations or union affiliation. The only difficulties we can see that might be encountered from operation of the wages and hours law is from the standpoint of the well-known chiseler. Certainly there are but few instances where industries would have to back-track to pay a minimum 25 c. an hr. on the basis of a 44-hr. week.

I think it has been proved very much in the last few years by the operation of various government departments that a shorter workweek is feasible in most industries.

I must admit to you that we have not taken much interest in this particular law nor its effective date in this territory and must confess to you that I am not very well versed on all the phases of this piece of legislation. The opinions as rendered here are based more or less on a hurried examination of the act. There has not been much consideration given to the matter, as in this locality this law will not affect many employers.

(Sand and gravel—Utah)

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OF course, we are looking forward to the wage-and-hour law with a great deal of doubt and skepticism, or we might say such a law is beyond our imagination. There is a probability that all angles and phases of the law may be worked out to operate smoothly and satisfactorily to all concerned, but we doubt the possibility of such magic.

Twenty-five cents per hr. is not too high if the industry will be allowed to recover the increased cost of production through coöperative price fixing, and if the industry can be assured that the government will allow a safe and sane business policy to operate without interference, and that corporations will cease to be the target of all tax measures. If the industry can be guaranteed the same health, efficiency and general well-being which the wage-and-hour law is trying to guarantee the worker, then we would say let the minimum wage be 50 or even 75 c. per hr. The same would apply to the 44-hr. week, as we believe that all that industry wants is a stable position on a parity with its fellow producers.

During the past five or six years the line between intrastate and interstate commerce has become more marked. If the law does not apply to both types of shippers alike, it is bound to cause discrimination; however, under the law as written, it is our opinion that it can now only apply to interstate shippers or those producing goods for use in interstate commerce. Due to the fact that the large portion of Federal-aid projects require native materials in so far as possible, our plant has shipped less than 5 per cent. of its total tonnage outside the state, and we are located only 9 mi. from the state line. Thus we feel that we have already been discriminated against.

We don't believe that a plant in Ohio can operate under the same rules and regulations as one in Mississippi. The cost of production varies, transportation problems are different. The cost of living to employees differs, raw materials are not available in the same manner. We don't believe that plants in the same locality can operate under the same rules, especially in the gravel-and-sand business; for the reasons just stated each plant has different production problems. We also believe that the law will be abused more through the exemption clause than in any other manner. We have not forgotten how those who were charged with the enforcement of the N.R.A. were usually the chief offenders.

The law, given strict enforcement and reasonable compliance, will raise the amount of income, but the quantitative purchasing power will probably be lowered, because the prices of the items the workers usually buy will increase by a greater percentage than their wages. The Negroes in the South will never favor the law; they would like the 25 c. wage, but the 44-hr. week would not suit them. The Negro has worked from dawn till dusk since time began and had rather make $12 per week working from sun till sun at $2 a day than to make $11 per week working 44 hr. per week. The 44-hr. week will also give the Negro, and lots of white people for that matter, lots of idle time in which to think up ways of getting in jail. Ninety per cent. of the idle Negroes in the South are just a few steps from a jail.

Employee-employer relations in the South as a whole have always been very good. We don't anticipate labor-union troubles or wage disputes.

We don't anticipate any labor difficulties as long as we are equally considered by the law along with all other producers. In case we are brought under the law, we will have to cut the wages of men who are now earning in excess of the minimum in order to pay those who are not earning the minimum, unless we can, as a company, earn sufficient money to pay the minimum wage to those not now earning it, in other words the company's earning power must in some manner be increased to offset the increased cost of production. This production cost will be increased not only by higher wages but by higher-priced repairs and supplies and we don't believe anyone can see just how far these increases should carry sales prices. Our question is how much to increase sales prices and how to sell our material at these prices. It will not be hard if all other plants are forced to increase in like percentages.

(Sand and gravel—Mississippi)

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ALTHOUGH the administrator of the Wage and Hour Division has been appointed, the regulations have not yet been completed and released. Until these regulations are issued, it seems impossible to anticipate with any degree of accuracy what the full economic effect of this law will be. The regulations may be prepared on a practical basis which will reduce the economic dislocations to the minimum or they may be so written as to involve serious and far-reaching effects on industry as a whole. The attitude of the courts will also not be known for some time.

In general, the minimum wages and maximum hours prescribed by the law will have little immediate effect on this company's operations, provided a proper seasonal classification can be obtained. If the industry is determined not to be of a seasonal nature, the provisions as to hours will involve considerable difficulty. In either event, however, the ultimate effect on the company's operations may be serious, if and when the law brings about an unfavorable general economic situation.

It is my opinion that this law is unsound, because it will be absolutely impossible to administer it so as to recognize and give effect to the vast multitude of different situations and circumstances which control our economic life, and also because it inevitably will result in a further expansion in governmental control, and political interference with natural economic forces. It will result in shifts between industries, geographical locations and classes of people, of compensation, and, therefore, of purchasing power. The very fact of these shifts in economic position seems virtually certain to hamper and curtail the production of goods, and to inevitably have a retarding effect on the net purchasing power and living standards of a large portion of the country's population.

(Gypsum—Illinois)

PERSONALLY, I think the wages-and-hour law as now set up, or as it possibly ever can be set up, is just another one of the administration's notions that it can help the working man by putting more regulation on industry.

Now, in the first place industry is just as individual as men themselves—by that I mean companies in the same line of endeavor—due to their geographical location, the population that is adjacent to them, population that would influence to a great extent the hourly rate of pay. In the event it was heavily populated the producer in that territory would have a big field to draw on for labor; if, on the other hand the same plant was removed to a sparsely-settled territory, the labor supply would be materially limited. This situation makes each and every plant an individual problem. Take, for instance, seasonable commodities, such as agricultural lime and limestone, the production of which is high possibly 2½ to 3 months in the year and flat the remainder of the time. In the production of highway aggregates it is very seldom that there is over a 6-months season. I think that under conditions of that kind, which could be found in every line of industry in the United States, it is woefully ineffective to try to enforce such a law as this.

I think 25 c. an hour is plenty low. It will not affect my company that I know of, as our rate is two and one-half times that.

The 44-hr. week is all right, with reasonable exemptions. It will affect us materially during the peak season of agricultural-limestone and highway-aggregate production.

I think the wage-and-hour restrictions and exemptions should be spread universally, whether the business be interstate of intrastate.

The law may or may not improve purchasing power, depending upon whether the factory or mine, wherein these people work, can take care of the high wages. If they can, of course it will be an advantage to the working man;—if they can't, the working man is out of luck.

The average union-labor rates are so much above this wage-and-hour bill—the working hours are even less—that I don't think it will make any particular difference with the labor leaders. I don't think it would loosen their hold on working men one particle.

Unless we are given reasonable and practical exemptions in the spring and fall to take care of peaks in agricultural and road materials, our costs will be considerably increased and naturally that cost will be passed on to the customer, who in most cases is a farmer.

(Crushed stone—Ohio)

THE 25 c. an hr. rate is lower than any now paid by this company.

Our union contract requires the payment of overtime for over 8 hr. per day, which would make a 48-hr. week. The men are seldom worked 48 hr., and the effect of the law will not be material on this company. I believe that producers of sand, gravel and crushed stone will come under the seasonal provisions of the law. This will permit 14 weeks during the year with employment up to 12 hr. per day. If this is so determined, the law should create no difficulty for this industry.

With our location on a state line, this company is constantly engaged in interstate commerce under the meaning of the act. We, however, are competing both in Kansas and Missouri with local plants not shipping interstate. A substantial injury would be done and competitive conditions seriously interfered with, if the interstate character of a business were determined on the basis of the individual operator rather than the industry. This situation will apply to the many areas in this industry where state lines are crossed, although it is probable that the largest number of producers do not ship interstate and may not compete with interstate shippers. This is undoubtedly true of the larger states of the West and Southwest.

In the South it is probable the results obtained by the use of common labor are not equal to those obtained in the North, but it seems likely to me that better efficiency would be obtained by higher wages. In those areas, if higher minimum wages are required, there may be a tendency to drive the less efficient workers into unemployment. There is, of course, a somewhat lower cost of living in the South and an intelligent differential is probably justified. The social implications of this are such that I doubt if I am justified in expressing an opinion. Some lessening in the differential between the South and the North will probably result beneficially to all.

I doubt if the law, reasonably enforced, will materially increase the income and purchasing power of workers. Increased production of goods and service would improve living standards in this country, but this will not be affected much by increases in rates of pay, although some equalization may result.

The tendency of the law may be to make labor unions less important and improve employer-employee relationships, but I doubt if the provisions of the present law will make very much difference.

So far as we are concerned in this area, the law will make very little difference, provided the industry, as a whole, is held to have interstate characteristics, and all parts of the industry are subject to the same conditions so that the competitive relationships are maintained. If this is done, the position of the union plants generally located in the larger metropolitan areas will be improved relative to the outlying plants and the temporary ones engaged in local production. If interstate characteristics are determined on the basis of the individual operator, it should have very little effect in this area as minimum wages are now above 25 c. an hr. and union wages are at least twice the required minimum.

(Sand and gravel—Missouri)

Numerous Problems to Arise as Consequence of New Wage-Hour Act

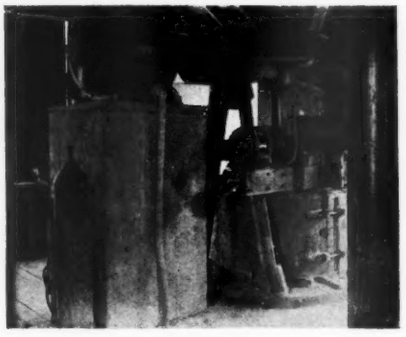
A new wave of wage demands and an acceleration of technological advance appear to be the probable consequences of the Federal wage-hour law, in the opinion of business economists Allen W. Rucker and N. W. Pickering. A preliminary study of this law, released by Farrel-Birmingham Co., Inc., Ansonia, Conn., under the title of *Coming Problems Created by The Fair Labor Standards Act of 1938,* summarizes the findings of Messrs. Rucker and Pickering.

"The outcome most likely is an accentuation of the shift or 'economic drift' of the normal distribution of the total wage fund of manufacturing industry. The prevailing drift is away from heavy industry. For instance, in 1929 labor in heavy industry received 59.48 per cent. of the total manufacturing wage fund; labor in light industry received 40.33 per cent. In 1935 heavy industry labor received only 50.58 per cent. and light industry labor 49.14 per cent. It is difficult to avoid the conclusion that stresses set up by this shift will appear in the form of renewed demand for wage increases, as heavy-industry labor seeks to counterbalance the shrinkage in the wage fund by higher rates of pay."

According to the Rucker and Pickering study, both the annual manufacturing wage fund and the annual manufacturing income fund are limited by external forces and neither can be expanded beyond the limits imposed by those forces. For that reason the attempt of the Federal government to raise the income of labor in some industries will be followed by corresponding reductions in the wage income of labor in other industries. The pressure, in the view of the authors, is likely to fall heaviest upon the highly skilled crafts and upon the heavy industries.

By W. E. TRAUFFER

LEFT—New agricultural-stone plant of the New Castle Lime & Stone Co. with belt-conveyor from waste stock-pile in foreground. BELOW—One of the pulverizers with table-feeder and chute at right.



QUARRY WASTE PAYS DIVIDEND IN NEW PULVERIZING PLANT IN PENNSYLVANIA

IN this age of subsidized farming with limestone-pulverizing plants springing up all over the country it is interesting to see what is being done by one of the oldest producers of this material. The New Castle Lime & Stone Co. was formed in 1917 primarily to produce agricultural limestone and fertilizer filler and has remained in that business ever since. The original pulverizing plant was built at Hillsville and this was rebuilt in 1921. Bradley Hercules mills have been used there for twenty years. This plant is on property adjoining the crushed-stone plant of the Lake Erie Limestone Co. from which stone is obtained.

In 1928 the company bought a limestone property at Dunbar, Pa., and built a 1,000-ton capacity crushed-stone plant. Other crushed-stone plants have at different times been operated by the company under lease. On May 1, 1938, the company put into operation a new limestone-pulverizing plant at Edenburg, Pa., near the plant of the Union Limestone Co. which supplies the stone.

This plant uses the sizes of stone, ranging down to dust, for which there is comparatively little demand. One of these materials is a 3/16-in. minus stone sand containing little dust, and another is screenings. The plant was built primarily for truck shipments of agricultural limestone and advantage was taken, in its design and in the selection of equipment, of the company's many years of experience in this field. All steel work including bins, batchers, elevator casings, etc. was supplied by the Heltzel Steel Form & Iron Co.

The raw material for this plant is obtained from the waste stock-pile by means of a Columbus reciprocating-plate feeder in a tunnel. This feeds the stone to a 16-in. by 150-ft. Columbus belt-conveyor with Republic belt. The conveyor feeds the stone into a 6-ft. by 45-ft. double-shell rotary drier. The feeder and conveyor are driven through Texrope by 5-hp. motors and the drier is driven by a 40-hp. motor through a Falk gear-reducer.

The drier is fired by a Combustion Engineering Co. Skelly stoker with a 7-ft. by 7-ft. fire-box which has a maximum capacity of 1,400 lb. per hr. The draft fan was specially built for this application by the Robinson Ventilating Co. and vents through a steel stack. The moisture content of the raw stone fed to the drier ranges up to 10 per cent. and the dried stone contains less than 1 per cent. of moisture.

The dried stone is discharged into a 40-ft. elevator which has 14-in. by 8-in. buckets and feeds a 3-ft. by 6-ft. Screen Equipment Co. vibrating screen. This screen is used to scalp out any occa-

The other pulverizer showing new type of direct drive. These mills exceed the standard fineness of 50% through 100- and 95% through 200-mesh.

Elevator from drier and mill-feed bin at left. At the right may be seen the elevator which feeds the finished product to the batcher bin.

sional stones over 2 in. in size before the material is discharged into a 175-ton Heltzel steel tank which is 16 ft. in diameter and 10 ft. high. Stone is discharged through rack-and-pinion gates into chutes and through these to the table feeders of the two Bradley Junior Hercules mills. These feeders are automatically governed by the load on the mill motors.

These mills are of standard 3-roll design but are equipped with a new type of direct drive. One mill is driven by a 75-hp. squirrel-cage motor and the other by a 100-hp. G. E. synchronous motor. The latter is used to correct the power factor for this plant and the crushed-stone plant as they are located near the end of a power line.

The mills grind to meet a standard fineness of 50 per cent. through 100-mesh and 95 per cent. through 20-mesh. Actually they grind finer than is required, and each averages 35 to 38 tons per hr. depending on the type of feed. The material can, if desired, be ground to 70 per cent. through 200-mesh for asphalt filler and rock dust for mines, but this type of material is now being produced at the other plant which is

The automatic stoker which fires the drier through fire-box at left.

equipped with bag-packers. The demand for agricultural limestone is seasonal and is concentrated mainly in the spring and fall.

Both the mills discharge their products into a 12-in. screw-conveyor. A 60-ft. bucket-elevator feeds a 30-ft. by 14-ft. Heltzel bin of 265-ton capacity. The screw-conveyor is driven by a 3-hp.

The weighing batcher with dial scale at right.

The double-shell rotary drier showing speed-reducer drive.

motor through a Falk speed-reducer and the elevator by a 10-hp. motor through a gear-reducer and Texrope. This material is withdrawn from storage through a special Heltzel diaphragm-type cement valve into a Heltzel 10,000-lb. cement-type weigh batcher, which is equipped with a Kron dial scale. This batcher is dust-proof and has a 4-in. vent pipe through which pressure is released. Another spout from this bin has a similar valve for loading material into the occasional trucks which are too high to be driven under the batcher.

No shipments are now being made by railway but the plant is on a siding and arrangements can be made for such shipments at any time. Near the plant is a concrete block office building with a Fairbanks truck-scale which is used mainly to weigh aggregates shipments.

Columbia Quarry Co. Wins Honors Again

The crushed-stone producers' safety contest of 1937, conducted by the Bureau of Mines in coöperation with the National Crushed Stone Assn., resulted in a marked reduction in the frequency of accidents among men employed at the quarries and crushing plants. Records submitted to the Bureau of Mines by the companies enrolled in the contest revealed a reduction of 22 per cent. in the accident-frequency rate. On the other hand, the accident-severity rate was higher than in 1936 due to an increase of 2 in the number of fatalities during 1937 and the heavy weighting in days lost chargeable for each fatality in computing the severity rate.

The trophy is awarded annually to the plant establishing the lowest accident-severity rate, that is, the fewest days lost from accidents per 1,000 man-hours of employment or exposure to risk. When two or more plants operate without a lost-time accident, the best record is considered to be that showing the largest number of man-hours worked; all other plants having accident-free records are awarded certificates of honorable mention.

The winning plant for the 1937 contest was the Krause No. 1 quarry, Columbia, Ill. This plant, operated by the Columbia Quarry Co., worked 219,069 man-hours during 1937 without a lost-time accident. This is the third successive year that the Krause quarry has won the National Crushed Stone Assn. safety trophy, and is the fifth successive year that the plant has operated without a lost-time accident. The total volume of employment during the five years amounted to 946,067 man-hours. The quarry has been enrolled in the contest since 1931 and has not had a lost-time accident since Sept. 22, 1932.

In addition to the Krause quarry, ten other open quarries and two underground mines were operated throughout the year 1937 with accident-free records, and each plant was therefore awarded a certificate of honor.

During 1937 there were 155 lost-time accidents at the 47 open quarries and 3 underground mines enrolled in the contest, including seven fatal and nine permanent partial injuries. The total time lost was 52,427 days. Based on 6,563,681 man-hours worked, the above figures indicate an accident-frequency rate of 23.6 per million man-hours and an accident-severity rate of 7.99 per thousand man-hours. For open quarries the rates were 24.5 and 8.44, a marked decline in frequency from the rate of 31.4 in the previous year, but an increase in severity compared with the previous year's rate of 6.68. Except for 1935 the frequency rate for 1937 was lower and therefore better than that of any other year since the contests were begun.

The largest conveyor belt ever manufactured was shipped recently by the Goodyear Tire & Rubber Co. to the Grand Coulee Dam, where it will carry aggregates at the rate of 2,000 tons per hr. The belt, of 8-ply construction, is 48 in. wide and 9,700 ft. long. It was built in eight separate sections, three of which are shown above, weighing 10 tons each. The sections were vulcanized into an endless belt for operation on 4,850 ft. centers on the site at Grand Coulee.

The four 1½-cu.yd. mixers and the three 5-cu.yd. mixers owned by Brooks-Wright, Inc., lined up in front of the batching plant.

By W. E. TRAUFFER

Firm in New Jersey Abandons Contracting Field to Engage in Gravel, Concrete Business

IN traveling about this country visiting various nonmetallic mineral operations, the writer occasionally encounters a plant which stands out in his memory because of original features of design and operation. When this plant happens to be alongside a nice cool swimming pool and the day is hot the combination leaves a lasting impression. Such was the situation encountered at the plant of Brooks-Wright, Inc. at Paterson, N. J.

This company, of which George Brooks is president and his brother, Harry Brooks, is vice-president and general manager, was originally engaged in contracting, but in 1933 this business was abandoned for the production of sand and gravel. The new plant went into operation in July, 1934 and shortly afterward a new ready-mixed-concrete and dry-batching plant was also built. The aggregate plant was designed by the Iowa Mfg. Co., which also supplied most of the equipment. The Erie Steel Construction Co. supplied most of the concrete-plant equipment.

The deposit is glacial and contains about 50 per cent. gravel. The overburden is too light to be removed. A ¾-cu.yd. steam shovel was originally used to load from the bank, but this was replaced in May of this year by a "Bank Special" Model 80 Haiss loader which has extra long and wide crawlers, "cobble guard" plates at the foot of the elevator, avalanche protection plates, a truck dispatching horn, and the Servis recorder described later. The loader is powered by a 60-hp., 6-cyl. Waukesha gasoline engine equipped with a self-starter. Feeding and digging propeller blades are made of manganese steel and there is an automatic release clutch for use in case of emergency or avalanche.

This machine loads from the bank direct to a Model 40 W International truck hauling a 7-cu.yd. load. The haul to the 12-cu.yd. plant hopper averages about 250 ft. and this arrangement has worked out very well, keeping the p'ant supplied with a steady stream of material.

The bank is about 50 ft. high, and some of the cobbles range up to 10 in. in size. The loader is digging on the average 500 cu.yd. of material daily. This output could be doubled, because the machine loads 6 cu.yd. in from 1½ to 2¼ min., but its present output of 500 cu.yd. daily is determined by the capacity of the plant.

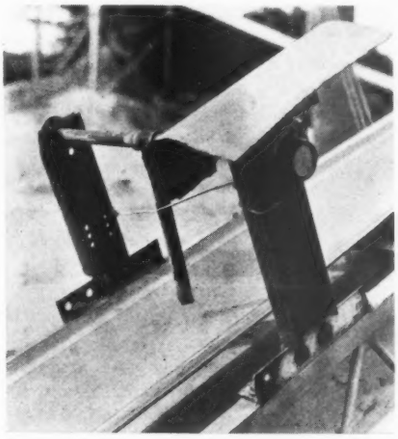
The operating cost of the loader has been estimated as follows:

Item	*PerDay*	*PerCu.Yd.*
Gasoline, 14 gal. @ 15 c.	$2.10	0.42c.
Operator	6.00	1.20
Repairs	1.25	.25
Up-keep, ½ hr.	.30	.06
	$9.65	1.93c.

In operating this machine it has been found possible to pull it out easily, even when avalanches have buried the tail shaft as much as 4 ft. Cobbles up to 10 in. in size have been prevented from wedging or jamming and bending the feeding propellers, buckets, and the elevator boom by means of the "cobble guard" plates. An overload release protects the elevating and digging mechanism.

Looking down on belt conveyor from aggregate plant to batching plant. Swimming pool is in background.

About a year ago the company had purchased a Haiss Model 27 crawler loader for rehandling stockpile and ground storage. This machine was so satisfactory and economical that it was decided to have a heavy-duty loader built to be used exclusively in the pit in



The recorder on belt-conveyor with dragging lever which keeps a record of plant-operating time.

place of the steam shovel. The order for this machine was placed on the assurance of the Haiss Mfg. Co. that such a loader could work in a 40-ft. bank with occasional slides and that it could handle cobblestones running up to 12 in. in size.

According to George Brooks this loader has proved to be very efficient and economical. He prefers it to any other type of loading equipment because of its lower first cost per unit of capacity, its greater mobility, its low operating cost, etc.

The screening-and-storage structure with tunnel-conveyor below. At left is loader used for reclaiming from dead storage.

The new loader feeding material from bank into truck for haulage to plant.

With this loader, said Mr. George Brooks, it is possible to pull down the bank and ride out with the loader as the bank avalanches. As there are various grades of material at different locations in the bank the speed and flexibility of the loader in moving around is also an advantage. The clean-up scraper attached to this machine acts as a bulldozer and cleans up and levels the ground in the pit. The gasoline consumption is checked daily and 500 cu. yd. are handled with 14 gal. of gasoline costing $1.50. The coal used by the steam shovel for handling the same quantity of material cost $5.00.

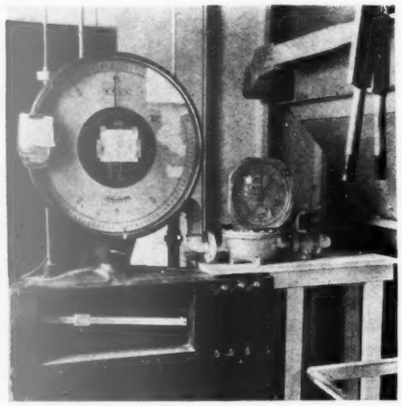
The 6-in. pump which feeds overflow from drag at right to classifier in background.

Material is discharged from this hopper by means of a 30-in. by 8-ft. belt-feeder on a 24-in. by 30-ft. inclined belt-conveyor. This in turn discharges the material on a 4-ft. by 8-ft. Cedar Rapids-Symons 2-deck screen with 2¼-in. and 1-in. openings. The oversize

The scalping screen with crusher below for reduction of oversize to return conveyor.

material goes into a 9-in. by 36-in. Cedar Rapids jaw crusher. The material retained on the bottom deck of this screen is discharged into a 3-in. by 36-in. Cedar Rapids jaw crusher. Both crushers discharge their product on a short return belt-conveyor which feeds the 30-ft. conveyor running to the scalping screen.

The material passing through the bottom deck of this screen is discharged



The aggregate-weighing batcher at right with dial scale and automatic water meter.

on an 18-in. by 80-ft. belt-conveyor feeding a 5-ft. by 24-ft. Cedar Rapids revolving screen. This has a 5-ft. by 7-ft. scrubber section followed by sections with ⅜-in. and 1½-in. openings. The 6-ft. diameter by 7-ft. sand jacket has 3/16-in. openings.

The three sizes of gravel produced

The 9-in. by 36-in. jaw reduction crusher with return conveyor below.

are discharged to stock-piles. Sand goes to a 25-cu.yd. per hr. drag dewaterer, which discharges concrete sand to a fifth stock-pile. This sand can also be fed to a short belt-conveyor feeding a dead-storage pile. The overflow from the concrete-sand drag goes to a 40-cu.yd. per hr. sand drag for the production of brick sand. This material is also stock-piled. The five stock-piles beneath the plant are separated by concrete partition walls which support the plant. Each pile has a live capacity of 150 tons. Under the storage is a concrete tunnel through which these materials are reclaimed on an 18-in. by 90-ft. tunnel belt-conveyor.

The overflow from the brick sand drag goes to a 6-in. Deming centrifugal sand pump which feeds a 12-ft. square Allen cone sand classifier. The product of this cone is discharged to a pile and is sold as asphalt sand. It is interesting to note that the three grades of sand can be produced at the same time and all will meet specifications. Another Haiss stock-pile loader is used to load materials into trucks from the dead stock-piles.

In operating the sand-and-gravel plant it was found that considerable time was being lost in loading and that as a result the plant was running idle a good share of the time. When the new loader was purchased for the pit a Servis recorder, made by the Service Recorder Co., was attached to it. The vibration of the machine when loading actuates a stylus which marks a chart. When this chart is removed at the end of each day it shows the time when the machine started and stopped loading and also the number of times the truck was loaded during the day. It also shows when the engine is running.

Another recorder was installed on the conveyor from the plant hopper. A pendulum hanging over the belt is kept in motion when there is material on the belt but hangs idle when the belt is shut down or running empty. This chart shows every delay in production and its duration.

According to Harry Brooks, these two recorders, through their psychological effect, have materially increased production and have also made it possible to trace the reasons for recurring delays. As the recorders are locked they can not be tampered with.

The loader operator is instructed to stop the engine between loads, which is no hardship as it has a self-starter. This keeps fuel expense to a minimum, reports showing a rate of 35 to 40 cu.yd. per gal.

The tunnel reclaiming belt-conveyor feeds an 18-in. by 135-ft. inclined belt-conveyor running to the top of the ready-mixed-concrete plant where the aggregates are discharged into the four compartments of a 400-ton Erie Aggremeter bin. A fifth size of aggregate can be loaded into trucks from this conveyor through a chute and spout. These bins supply material to a 5-cu.yd. Erie weighing batcher which is equipped with a Kron dial scale. A Neptune automatic water meter measures water for the truck-mixers. The water is discharged direct into the mixer and the water-measuring tanks on the mixers are never used. Cement is dumped from cloth sacks through a chute into the truck-mixers. A small sack cleaner is used and this saves enough cement to pay for the cost of handling and loading the cement into the trucks. All the loading of aggregates into trucks for delivery or stock-piling is also done through this plant.

The company began with two 1½-cu.yd. Jaeger truck-mixers and soon afterward added two more similar units. In 1936 two Jaeger 5-cu.yd. truck-mixers were added and in April of this year another 5-cu.yd. machine was purchased. The three 5-cu.yd. mixers are mounted on Autocar chassis and the 1½-cu.yd. mixers are on Fords. With this equipment as much as 275 cu.yd. of concrete has been produced in a day and an average output of 20 cu.yd. per hr. can be maintained. Deliveries are made for distances up to 25 or 30 mi. which can be done economically with the large trucks as they can maintain a fairly high rate of speed on the level and on hills The plant location just outside of Paterson is within easy reach of dozens of other communities.

Use Vermiculite Flakes on Fair Buildings

Vermiculite will shed its golden glow to further the glory of the Golden Gate International exhibition in 1939. Sparkling flakes of this relative of the mica family are to be used to enliven the surface of the cement stucco of which the Fair buildings are constructed. The scintillating particles are applied to the wet stucco and the final effect—though costing very little—is most attractive. About 150 tons will be required to diffuse the golden glow over all of the buildings.

Vermiculite is the interesting mineral that, upon heating, exfoliates or expands—looking like a miniature accordion—to several times its original size. The intensity of the color depends upon the iron content and upon the manner in which it is heated. The small particles used for decoration are the broken fragments; these have to be ground by special devices so as to preserve the golden color.

Cement Imports Rising, U. S. Figures Indicate

Substantial increase in cement imports into the United States during April are revealed in figures made public by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce. During the month 74,602,909 lb. were admitted at a value of $164,453. This represented an increase of more than 15,000,000 lb. over April, 1937, and about 46,000,000 more than was imported in March, 1938. Exports of cement from the United States for April were valued at $94,523.

Eugene R. Atwood,
Treasurer and General Manager, Old Colony Crushed Stone Co., Quincy, Mass.

MEN · OF · THE · INDUSTRY

Born in Chelsea, Mass., Nov. 10, 1866, Mr. Atwood has been associated with the nonmetallic-minerals industries since he attended high school. His earlier connections were concerned with the manufacture of tile and brick and in 1902 he joined the Old Colony Trap Rock Co. of Quincy and remained with the organization for several years. In 1905 he organized the Tidewater Broken Stone Co. Returning to the Old Colony site in 1908, he formed the Old Colony Crushed Stone Co. which over a 30-year period has grown to become one of the outstanding crushed-stone operators in New England. Mr. Atwood has always taken an active part in the affairs of the National Crushed Stone Assn. and is a familiar figure at its meetings. His hobby, in which he finds much joy and appreciation, is music.

Personal Mention

V. V. Kelsey, vice-president and sales manager of the Consolidated Feldspar Corp., Trenton, N. J., has resigned, effective September 1 to become president of Dominion Minerals, Inc., of Washington, D. C.

E. A. Heise, who has been safety engineer at the Krause, Ill., plant of the Columbia Quarry Co. which has just won the N.C.S.A. safety contest for the third consecutive year, has had his efforts recognized in a tangible way by his promotion to superintendent. He succeeds C. E. Klaus who has taken a position with the Charles Stone Co.

Harold Myers, who has been directing operations at the Chillicothe, Mo., plant of the Cooley Gravel Co., has resigned to become superintendent of a power plant at Plattsburg, Mo.

A. T. Goldbeck, engineering director of the National Crushed Stone Assn., has been named a member of the executive committee of the A.S.T.M.

John W. Stockett, Jr., of the National Lime Assn. staff has been elected secretary of Committee C-7 of the American Society for Testing Materials to serve during the next two-year period.

Harry F. Gonnerman, manager of the Portland Cement Assn. research laboratory at Chicago, has been elected a director of the chemical and metallurgical-engineering section of the Western Society of Engineers.

Earl Hobbs of Salem, Ind., and George M. Spangler of Campbellsburg, Ind., have purchased the Campbellsburg Rock Wool Co. plant from the receiver for the Mineral Felt Co., Toledo, O. They plan to operate in the near future after plant improvements are completed.

Paul H. McMillin, president of the Roche Harbor Lime & Cement Co., Roche Harbor, Wash., has been chosen director of District 14 of the National Lime Assn.

Lee S. Trainor, head of the construction department of the National Lime Assn., who suffered a stroke several months ago, is slowly convalescing. He is still at his home in Braddock Heights, Md., but is able to be out in a wheel chair and has enjoyed a few automobile rides.

E. M. Stephanus, who has been in charge of the Chicago branch office of the Broderick & Bascom Rope Co., has been transferred to Pittsburgh, Pa. J. J. Sieber, formerly located at the St. Louis home office is now in charge at Chicago.

Andrew Lundteigen, vice-president of the Ash Grove Lime & Portland Cement Co., Kansas City, Mo., was honored at the recent annual meeting of the A.S.T.M. as a 40-year member. He has been affiliated with the society since its organization in 1898.

C. W. Crumb has been appointed central-division sales manager for Oliver United Filters Inc., with headquarters at 221 N. LaSalle St., Chicago, Ill. Mr. Crumb has been connected with Oliver United for the past 11 years as sales engineer.

Elmer F. Andrews, New York state industrial commissioner, has been chosen by President Roosevelt as administrator of the Federal wages-and-hours law passed by the last session of Congress.

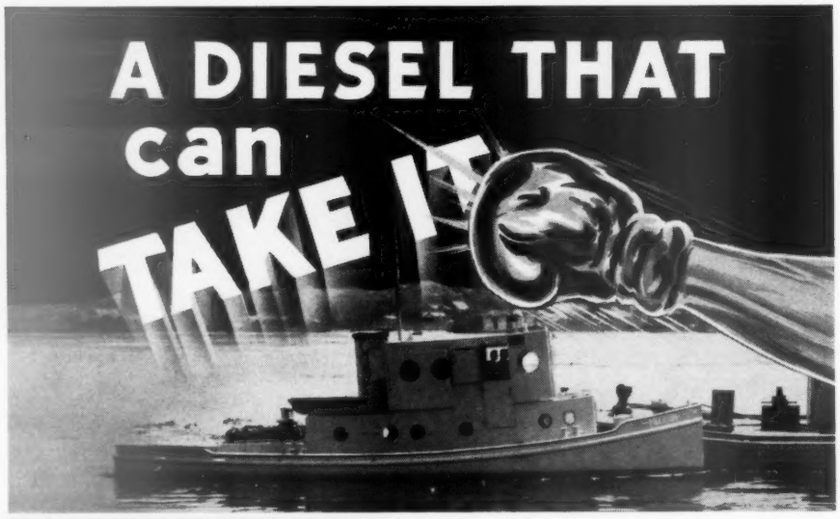
Arlington E. Gittings has leased the old Rockel white limestone quarry near Dallas City, Ill., and has started operating.

A. W. Wilkey and his son have started producing sand and gravel at a deposit east of Marston, Mo. Capacity is reported to be 400 tons per day.

Albert Hantla of Meade, Kan., is arranging to open a silica-sand plant near Edison, Neb. Much of the equipment to be used is being built by the Meade Sheet Metal Co.

Joseph H. Hayden, secretary of the Hewitt Rubber Corp., Buffalo, N. Y., has been elected a member of the board of directors. William S. Carleton, New York, N. Y., and Lester D. Bigelow, Chicago, Ill., have been elected vice-presidents.

M. Moss Alexander, president of the Missouri Portland Cement Co., St. Louis, Mo., attended the annual meeting of the Southwestern Division of the Chamber of Commerce of the United States at Kansas City recently. He is one of the directors.



2 YEARS DRIVING A GENERATOR.
2 YEARS DRIVING A 10" DREDGE PUMP.
1½ YEARS DRIVING THE "FALCON".

Shell Producers' 45 foot tug "Falcon" powered with a Type EP, 6-cylinder Diesel developing 150 hp at 500 rpm . . . one of the most powerful tugs of her size in the U. S.

Here's proof that Cooper-Bessemer Diesels fit into any power picture! Purchased by Shell Producers Company in 1933, this engine is now serving their tug "Falcon" in making regular tows . . . 200,000 gallons of gasoline from Jacksonville to Sanford, Florida (147 nautical miles) in 26 hours.

Cooper-Bessemer Diesel Engines are easy to handle, economical to fuel and maintain, and gluttons for hard work. Investigate them for your power need . write our nearest branch for information.

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GEORGE NICHOLSON, JR., founder of the old White Marble Lime Co., Manistique, Mich., which was sold about ten years ago to the Inland Lime & Stone Co., died recently in a Manistique hospital. He was 87 years old. He entered the lime business in the early 1880's, building his first plant at Hayton, Wis. In 1888, on snowshoes, he covered the entire Dorr peninsula in Wisconsin, exploring for the dolomite formations which later led him to Manistique. Analysis of peculiar rock formations at Blaney, Mich. noticed by Mr. Nicholson at the turn of the century, revealed high calcium limestone. He purchased 160 acres and opened the Calspar quarry, which he operated for 25 years. The property was later purchased by the Inland Lime & Stone Co., which absorbed the White Marble Lime Co.'s interests in 1928.

WALTER E. HART, for the past two years office engineer at the Kansas City district office of the Portland Cement Assn. and previously manager of the P.C.A. structural bureau at Chicago headquarters, died August 1. He had been in poor health for some time. Burial took place at Rock Island, Ill., on Thursday, August 4.

JOHN F. CARTY, former general manager of the old Knickerbocker Lime Co., located in Chester County, Pennsylvania, died recently at his home in Philadelphia at the age of 76. He retired 15 years ago as manager of the business founded by his father, the late Andrew Carty, a century ago.

ALEXANDER BIRNIE, 61, well-known sand-and-gravel producer and contractor of Ludlow, Mass., died recently. He organized the Birnie Sand & Gravel Co. in 1913, later known as the Birnie Construction Co. and had been active in the affairs of the National Sand & Gravel Assn. He was a native of Brooklyn, N. Y.

W. A. CORL, president of the Independent Gravel Co., Joplin, Mo., died August 3 at the home of his son in Webb City, Mo. He had lived in Webb City 55 years and had been identified with bank interests there as well as with other industrial operations in the Joplin district.

CHARLES M. MORGAN, 45, an employee of the Marblehead Lime Co. at Hannibal, Mo., met his death recently when he was struck by a piece of rock during a quarry blast. A skull fracture was the cause of death.

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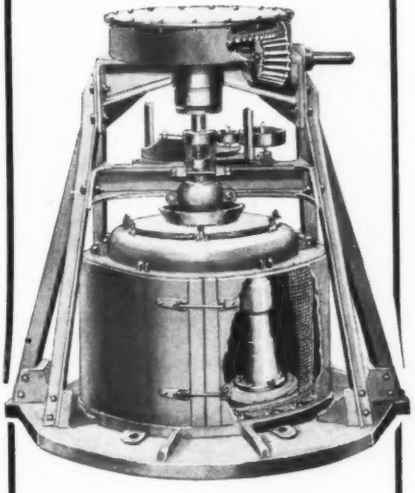

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Foreign Developments

Formation of Mixed Crystals and Alite

From exact roentgenographic investigations of experimentally burned $2CaO.SiO_2 + CaCO_3 + Al_2O_3$ and $3CaO.Si_2 + 3CaO.Al_2O_3$ at 1,400 deg. C. the authors were able to determine that tricalcium silicate as it is formed can include Al_2O_3 in its crystal structure in place of SiO_2. This can also occur in the finished product if the latter is in contact with tricalcium aluminate at sufficiently high temperature; at 1,400 deg. some 6 to 7 per cent. of aluminate dissolves in the silicate structure.

This brings to an end the old controversy over what alite is, and is in favor of a mixed crystal between $3CaO.Al_2O_3$ and $3CaO.SiO_2$. The next question is how this abnormal crystal forms, and especially how it forms without any noticeable change in the structure constant. The authors in an earlier work touched on this question and discussed the substitution of Si by the group Al_2O_3. A more plausible explanation is that 3Ca + 6Si is replaced by 10 Al, for the sum of the valances and the ions are equal in this case.—Wilhelm Jander and Joseph Wuhrer in *Zement* 27:377-379, June 23, 1938.

Urges Development of Diatomaceous Earth

The author urges the development of Italian deposits of diatomaceous earth and the use of this substance as an admixture for concrete and mortar. The most important studies of the employment of this material, especially by American and German authorities, are reviewed, with individual attention to the effect of such admixtures on strength, workability, impermeability and pozzuolanic action, and methods of use are discussed.—Dr. Corrado Vittori in *L'Industria Italiana del Cemento* 10:185-190, June, 1938.

Addition of Barium Carbonate to Cement

In the Roads and Bridges Laboratory in Paris it has been determined by recent investigations that the permeability of mortar and concrete is greatly reduced if 0.5 to 2 per cent. of barium carbonate is ground with the Portland cement. Calcium sulphate which works into the mortar forms with the $BaCO_3$ the two insoluble compounds barium sulphate and calcium carbonate, which close up the pores of the mortar and prevent a diffusion of the corrosive waters into the deeper portion of the mortar. An abnormal increase in volume (unsoundness), as in the formation of ettringite, does not take place in this instance.—*L'Industrie Chimique,* 24, 518, 1937; digest in *Zement* 27:427, July 14, 1938.

To Increase Production of Gyratory Crusher

Increases in the output of gyratory crushers may be effected by (1) careful attendance, (2) suitable repair, and (3) special mechanical changes. Careful attendance should prevent overloading and choking, and underfeeding and running empty, and the proximity of articles, such as wrenches and hammers, which might get into the crusher and cause damage. Suitable repair is a function of the machine-shop usually operated in connection with the plant; its purpose is to keep the parts, especially the jaws, in the best working

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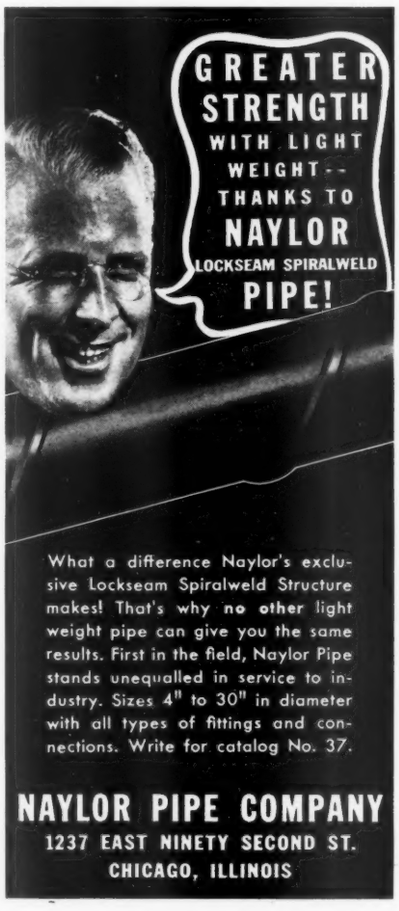
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condition, as the operation of a faulty crusher, as with worn jaws, will not only reduce output, but will also decrease efficiency and increase costs. Mechanical adjustments are the province of the builder or specialist; the capacity may, if conditions warrant it, be increased by changing the eccentricity of the eccentric shaft or similar changes.—C. Heubling in *Steinbruch und Sandgrube* 37:161-162, July 5, 1938.

Determining Heat Evolved in Setting

Studies on the heat evolved in the setting of cement involved the designing of a new type of apparatus for measuring the heat evolved. This apparatus, described in detail and compared with apparatus used by earlier investigators, consists of insulated containers with thermal elements and recording devices, and operates on the adiabatic principle. Studies were made on two cements commercially available in Germany, a standard Portland and a "super" Portland of high-early strength and differing from the standard Portland mainly in the fineness of grinding. Curves prepared from the investigations show that the end of the development of heat is not when the curve reaches the maximum, as the maximum merely denotes the point at which the heat loss began to exceed the development of heat. The end of the heat development is placed at 20 hr. in the case of both cements.

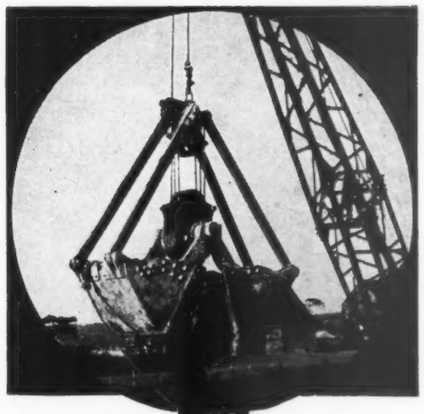
The maximum temperature attained by the "super" cement was 13 deg. higher than in the case of the standard Portland, and the rise in temperature was much sharper, but in both cases the development was placed at 48 kilocalories per kilogram. To bring out the difference in the rate of the development of heat from the two cements the differentials are compared. Other possibilities of application of the results of this and similar studies are suggested. —Dr.-Ing. Keller in *Zement* 27:423-427, July 14, 1938.

Ferrari Cement Not a "Special" Cement

The type of cement to which has been given the name of Ferrari is characterized by the fact that the alumina and the iron oxide are present in ratio by weight equivalent to 102.2 : 159.6 or 0.64—that is, in nearly the inverse ratio to what these constituents generally have in Portland cement. They grew out of observations made at the Cementaria Italiana at Livorno between 1909 and 1913, where cements were made with about the same hydraulic and silica moduli but sometimes quite different as to the alumina ratio. The development of the Ferrari cements and of the scientific investigation of their properties, and some of the most important of these studies are reviewed in this article.

Various investigations have credited to the Ferrari cements (1) perfect workability of mortars and concretes gaged with low percentages of water; (2) regularity of set; (3) rapid hardening; (4) high cementing value, and consequent high strength of mortars and concretes even in lean mixes; (5) limited development of heat during setting and hardening; (6) great reduction of shrinkage; (7) most favorable variation of elasticity in hardening; (8) resistance to the action of aggressive agents; and (9) better conservation. Neither Portland nor any other type has all these qualities at the same time and in the same cement.

Ferrari cement, accordingly, is not a simple "special" cement, but a cement for general use and one whose employment and applications should be greatly extended. In addition to the properties enumerated, it has the advantage of economy in manufacture. For low values of the silica modulus (about 1.5) it is possible to effect a saving of about 10 per cent. as compared with the average fuel consumption in making Portland.—F. Ferrari in *Revue des Materiaux de Construction et de Travaux Publics,* No. 346, July, 1938, pp. 121-127.



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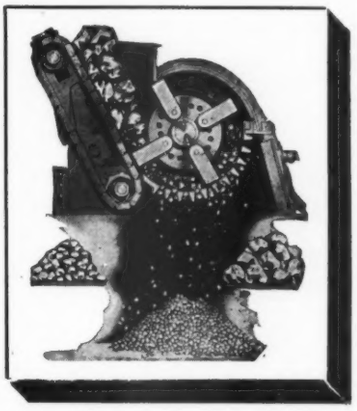

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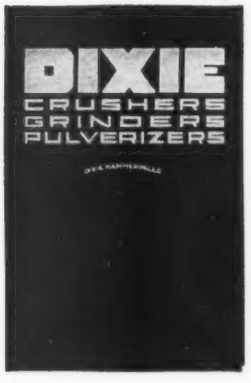

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Occupational Diseases and the Law

Tuberculosis; Lime Dust

Gardner v. *Southern Kraft Corporation,* decided by the Court of Appeal of Louisiana, Second Circuit, April 29, 1938, reported at 181 So. 692. The plaintiff in this suit sought compensation for total and permanent disability under the provisions of the Louisiana Employers' Liability Act, Act No. 20 of 1914, as amended. That act provides for compensation to an employee who "receives personal injury by accident arising out of and in the course of . . . employment." It was the plaintiff's contention that he suffered an accident while cleaning out a lime burner of the defendant corporation, in that he inhaled a large quantity of lime dust, aggravating and causing to flare up the partially active tuberculosis which he had previously contracted as an employee of the defendant.

The Court of Appeal, affirming the judgment of the trial court, rejected the plaintiff's demands on the grounds that (1) the evidence that there was an accident is not legally conclusive, and (2) assuming that there was an accident, the plaintiff did not discharge the burden imposed upon him of proving that it was responsible for or had a causal connection with his asserted disability.

Common-Law Action

Dixon v. *Gaso Pump & Burner Mfg. Co.,* Supreme Court of Oklahoma, November 16, 1937, rehearing denied June 21, 1938, application for leave to file second petition for rehearing denied July 5, 1938; reported at 80 Pac. (2d) 678. This case involves an employee's common-law right of action in Oklahoma against an employer when he has no remedy under the Oklahoma Workmen's Compensation Act for disability due to occupational disease.

The plaintiff's action is based on injuries from carbon-monoxide poisoning, an occupational disease, alleged to be the result of poisonous fumes and gases from a Diesel engine and the burning of open gas stoves in the building in which the plaintiff worked. The plaintiff originally claimed compensation under the Workmen's Compensation Act, but the Industrial Commission denied an award, holding that the evidence did not show an accidental injury arising out of and in the course of employment, within the scope of subdivision 7 of Sec. 13350, Oklahoma Statutes 1931. This decision was sustained by the Oklahoma Supreme Court [*Dixon* v. *Gaso Pump & Burner Mfg. Co. et al.,* 167 Okla. 401, 29 Pac. (2d) 764], holding that occupational diseases are not compensable under the Workmen's Compensation Act [see also *Thomas* v. *Ford Motor Co. et al.,* 114 Okla. 3, 242 Pac. 765; *Vaughn & Rush et al.* v. *Stump et al.,* 156 Okla. 125, 9 Pac. (2d) 764; *Wilson & Co., Inc.* v. *McGee et al.,* 163 Okla. 99, 21 Pac. (2d) 25]. An "occupational disease" is "a diseased condition arising gradually from the character of the employee's work, but it is not an 'accident'. 'An accident', as contemplated by the Compensation Act, is distinguished from an occupational disease in that it arises by some definite event, the date of which can be fixed with certainty, but which can not be so fixed in the case of occupational diseases".

In the present case the plaintiff bases his action under the common law and also under Sec. 10890, Oklahoma Statutes 1931, which provides: "An employer shall be responsible in damages for personal injury caused to an employee, who was himself in the exercise of due care and diligence at the time he was injured, by reason of any defect in the condition of the machinery or appliances connected with or used in the business of the employer which arose, or which had not been discovered or remedied owing to the negligence of the employer, or of any person entrusted by him with the duty of inspection, repair, or of seeing that the machinery or appliances were in proper condition".

The court holds that the plaintiff is not estopped in the present case because of the earlier proceeding before the State Industrial Commission; that, having failed to establish a cause of action before the Industrial Commission, he is not "left without a remedy and without a forum in which to litigate his alleged cause of action". Where the Workmen's Compensation Law is inapplicable the employee may have recourse to his common-law remedy (28 R.C.L. par. 117); this is in harmony with the latter part of Sec. 13402, Oklahoma Statutes 1931, which provides: "that for any injury for which compensation is not provided under the provisions of this act the injured party shall have the right of action in the courts for his damage on account of such injury".

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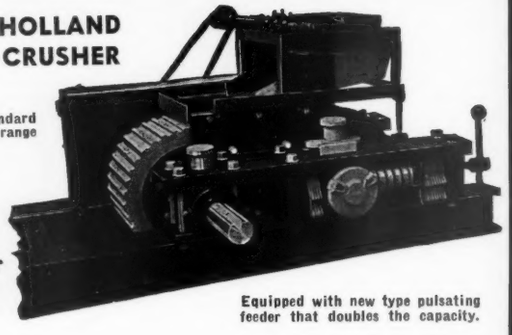

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In the trial the lower court sustained the defendant's demurrer to the plaintiff's evidence and dismissed the suit. The Supreme Court holds that the evidence made out a *prima facie* case and that the sustaining of the demurrer and the judgment for the defendant were errors. The case is accordingly reversed and remanded.

The Indiana Act

In re Jefferies, decided by the Appellate Court of Indiana, May 10, 1938; reported at 14 N.E. (2d) 755. This is apparently the first case under the Indiana Workmen's Occupational Diseases Act, enacted in 1937, to reach a decision in the higher courts. It reached the Appellate Court on a certification of facts and a question of law by the Industrial Board, and involves the interpretation of provisions of the act dealing with the "last employer" in whose employment the employee was exposed, and with the period of "last exposure", which in cases of silicosis and asbestosis must be at least 60 days after the effective date of the act. The court determines that any exposure to the hazards of the disease of silicosis previous to the effective date of the act can not be taken into consideration in determining the "last employer in whose employment the employee was last exposed to the hazard of disease, during a period of 60 days or more after the effective date of the act". In the present case the employee had been in the employ of a foundry company and constantly exposed to the inhalation of silica dust for six consecutive years, but not for the full 60 days after the effective date of the act, and consequently was held not to be entitled to compensation under the act.

The court further holds that the rules controlling the administration and construction of the Indiana Workmen's Compensation Act are applicable to the Workmen's Occupational Diseases Act. "In the enactment of the Workmen's Occupational Diseases Act, the legislature created new rights and remedies not theretofore existing under the common law or statutes of this state. . . . Within the scope of its operation this law is exclusive. No rights are conferred and no benefits derived therefrom, except such as are specifically provided for therein. The persons by whom such rights are to be exercised are confined to those included within the act." Furthermore, "the legislature did not intend by the passage of the act to nullify any right of action existing at the time this act became effective, nor did it intend that the act should be retroactive".

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Traffic News Digest

LEGISLATION

Transportation Conference—A transportation conference has been called for Sept. 14th and 15th in Washington by George H. Davis, President of the Chamber of Commerce of the United States to consider possible transportation legislation to be proposed to Congressional leaders at the next session of Congress. In calling this conference Mr. Davis said:

"The Chamber's transportation committee, which has recommended calling the conference, includes representatives of the general public interested in transportation. The committee welcomes the assurances given by congressional leaders that preliminary work on a transportation legislative program will be actively taken up by congressional committees, probably in November.

Meanwhile it is timely for interested parties to formulate suggestions and, obviously, a common understanding as to the essentials of a practical program is the chief outstanding requisite on the part of the different agencies, particularly the railroads, to promote agreement as to remedial measures, and to further coordination of effort.

Among the subjects which have been suggested for consideration by the conference may be mentioned policies having to do with railroad revenues; policies affecting economies in railroad operation; problems of competition among transportation agencies; and the question of the organization of government agencies dealing with transportation."

I. C. C. DECISIONS

Lime—In response to fourth section application No. 17,201 the Commission has authorized carriers parties to Jones' I. C. C. 2,920 to establish and maintain rates on lime from points in West Virginia, Ohio, Michigan and Indiana to destinations in Illinois Freight Association and western trunk line territories without observing the long and short haul clause of section 4. Rates to intermediate points are not to exceed those prescribed by the Commission in I. C. C. Docket No. 16,170. A further restriction is the usual 33⅓ and 50 per cent. circuity rule. I. C. C. FSO No. 13,166 Lime from Central territory to western points.

In an application for a common carrier permit, John H. Monroe, a motor carrier, was found to be transporting livestock from Percellville, Va., to destinations in Maryland. In his application he asked for a certificate authorizing operation as a common carrier of farm commodities including fertilizer and lime between points in Maryland, Virginia and the District of Columbia. It developed that his principal business was hauling livestock and that the fertilizer and lime were hauled on return trips and purchased outright by him and sold at his store at Percellville. The Commission found that carriers of livestock are not subject to the motor carrier act and that if he hauls other commodities without compensation he is also exempt from the provisions of the act. The Commission has construed that part of section 204 relative to motor vehicles used, "exclusively," for livestock as meaning, "exclusively for hire." I. C. C. Docket No. MC 86,921 John H. Monroe, common carrier application.

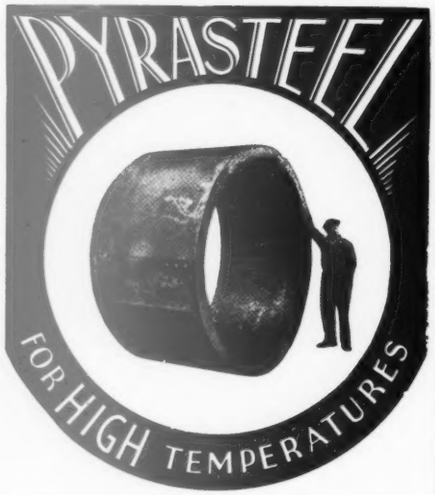
Limestone—In response to fourth section application No. 17,267 the Commission has authorized the G. M. & N. and connecting carriers to establish and maintain rates on ground limestone and stone dust from Dugan and Irvington, Ky., to Mobile, Ala., without observing the long and short haul clause of section 4, the minimum rate allowed being $2.91 a net ton. I. C. C. F. S. O. No. 13,191 limestone to Mobile, Ala.

Sand—Finding the claim barred by the statute of limitations the Commission has dismissed the complaint on sand from Hawarden, Iowa, to Baltic, Mitchell and Flandreau, S. D. Between Sept. 2, 1932, and June 8, 1935, and has dismissed the complaint in I. C. C. Docket No. 27,831 Western Asphalt Paving Corp. *v.* Milwaukee.

Motor Commodity Rates—Motor carriers in New England territory in an effort to secure more business published schedules reducing the rates on a large number of commodities to points in New England and northern New Jersey and eastern New York. The proposed schedules were suspended and after hearing the Commission has found that they were not justified and has ordered the schedules cancelled. The Commission said that it became apparent that unless steps were taken to halt the downward trend many carriers without cash reserves or borrowing power would be forced into receivership or to discontinue operations. This decision is an indication that unless carriers can definitely show that the lower rates will still be profitable that further reductions in the rates are not going to be permitted. I. C. C. Docket I. & S. No. MO228 and *Ex Parte* MC-22 Commodity rates in New England territory.

Motor v. Rail Rates—In a decision which does not directly involve a non-metallic mineral but is of interest because of the principle involved, the Commission has denied a certificate for operation by an applicant motor carrier who proposed to establish rates lower than those charged by a competing rail line. In this case the motor carrier proposed to establish rates on soda-ash from Saltville, Va., to Canton, N. C., to serve the mill of the Champion Paper & Fibre Co., at Canton, which uses about 8,000 tons annually. From the testimony of the applicants own witnesses the service of the railroads appears to be reasonably adequate for the transportation of soda-ash, both as to speed and to frequency of operation. A representative of the Paper Company testified that the advantage which would result to that company by truck operation would be a reduction in the rate, but the Commission in its finding said that there was no basis for finding that rates now in effect were too high and even if that should be the case that fact alone would not justify the issuance of a certificate to an additional carrier in this territory. I. C. C. Docket No. MC 37,896 sub No. 1, J. N. Youngblood extension of operations.

In two other cases dealing with Motor *v.* Rail Rates the Commission has prescribed rates for both rail and truck traffic on the same level. In Docket No. 26,210, gasoline from San Francisco Bay points to Ogden, Utah, it prohibited the railroads from reducing the rates and in Docket No. MC-C21 Banberger Electric Railroad Co. *v.* Lang Transportation Corp., it prescribed rates on gasoline from San Francisco Bay points to Ogden, on the same level as applied via the rail lines. This would indicate that as far as the Commission is concerned it is not going to allow railroads to make low rates to meet truck competition or allow trucks to make lower rates to take business away from the railroads.



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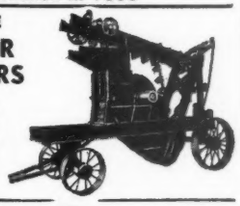

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Large capacity
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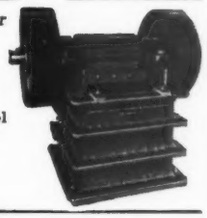

STRAIGHT LINE ROCK AND GRAVEL CRUSHING AND SCREENING PLANTS

GRUENDLER
CRUSHERS · PULVERIZERS · GRINDERS

GRUENDLER CRUSHER & PULVERIZER CO.
2915-21 N. Market St., St. Louis, Mo.

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Patented

The only vibrating screen with a POSITIVELY CONTROLLED circular motion.

IT DOES A BETTER JOB!

SCREEN EQUIPMENT CO.

9 Lafayette Ave. Buffalo, N. Y.

NEW COMPLAINTS FILED

Limestone—The Commission has suspended schedules in supplements No. 56 to Union Pacific I. C. C. No. 2468, proposing to establish reduced rates on limestone in carloads from Sugar-Factory (Logan), Utah, to Burley, McMillan and Paul, Ida. The proposal would have reduced the rates to Paul and Burley from $1.86 to $1.60 and to McMillan from $1.87 to $1.78 per net ton. I. C. C. Docket No. I. & S. 4514.

Plaster and Plasterboard—New rates and reparation are sought in connection with the shipment of plaster and plasterboard from Plasterco and Plasterco Junction, Tex., to destinations in Indiana and Kentucky after July 7, 1936 on an alleged violation of section 1, in a complaint filed by F. J. Wright, 2707 First National Bank Bldg., Oklahoma City, Okla., in I. C. C. Docket No. 28,061, S. M. Gloyd, and Texas Cement Plaster Co., Oklahoma City, Okla. *v.* Santa Fe *et al.*

Sand and Gravel—Alleging violation of sections 1 and 3 with undue preference for shippers in the Chicago district; reasonable rates on sand and gravel from points in Illinois, Indiana and Wisconsin, to destination in Illinois, were prayed for in a complaint filed by C. B. Ackerman, 608 S. Dearborn St., Chicago, Ill., in I. C. C. Docket No. 28,064, E. A. Keller & Sons, La Grange, Ill. *et al. v.* Alton *et al.*

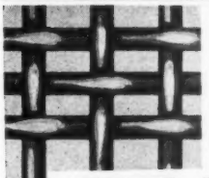
The Commission has instituted a proceeding on its own motion inquiring into intrastate rates in Kansas on sand, gravel and other commodities as a result of the refusal of the Kansas Commission to permit Ex Parte 123 increases to be applied intrastate on this traffic. I. C. C. Docket No. 28,070, increases in Kansas freight rates and charges.

Stone—The Commission has instituted a proceeding on its own motion inquiring into the intrastate rates on limestone and other commodities within the state of Louisiana as a result of the refusal of the Louisiana Commission to permit Ex Parte 123 increases to be applied intrastate on this traffic. I. C. C. Docket No. 28,065, increases in Louisiana freight rates and charges.

Minimum Charges—The Commission has instituted an investigation into the minimum charges and the value of the service thereunder of contract carriers by motor vehicle on various commodities between points in Illinois, Indiana, Michigan, Ohio and Wisconsin, on the one hand, and points in Iowa, Kentucky, Missouri, New York, Pennsylvania and West Virginia on the other in Ex Parte MC-27, Central Territory contract-carrier rates.

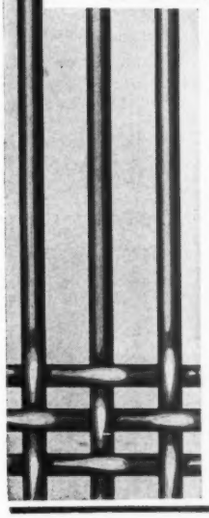
TRAFFIC NEWS

Tariff Simplification—A most welcome news item to any one who uses freight tariffs is the announcement of the American Association of Railroads of the publications of their tariff circular A. R. R. No. 1, listing 36 rules for the simplification of freight tariffs. Tariffs that are reissued since the publication of this circular are supposed to adopt these 36 recommendations. The first rule covers commodity descriptions and proposes that all tariffs and exceptions to the classifications use the same destinations as are used in the consolidated classification. Among other things, these rules cover duplicate publication of commodity rates; numbering of supplements; distance tables; territorial scope of tariffs; uniform symbol and reference marks; explanation of symbols in supplements; standard station index numbers; alphabetical in lieu of geographical listings of stations; alphabetical arrangement of stations separately by states and other important rules designed to make the tariffs follow a uniform design.



NO. 9381
TY-ROD
U. S. PATENT
NO. 2,024,806
TRADE-MARK REG.

TY-ROD
HIGH CAPACITY SCREEN



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TYLER
WOVEN WIRE
SCREEN CLOTH
in All Meshes
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SCREENS

HUM-MER and
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Cleveland, Ohio

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are the modern means of producing extremely fine products and increasing Mill capacities. Tell us of your problem.

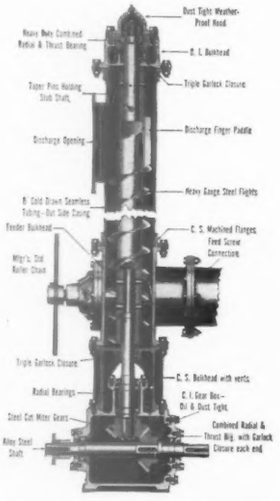
STURTEVANT MILL CO.
Harrison Square, BOSTON, MASS.

New Machinery and Supplies

• Screw Elevator

The new Sprout-Waldron vertical-screw elevator provides a method of low-cost, trouble-free, dust-tight, weather-proof handling of bulk materials from cars to storage, or from one machine or bin to another. It is truly a new vertical-screw elevator, of a design based upon all the true engineering problems involved in lifting materials vertically.

Heretofore practically all vertical screw elevators have been designed and built upon information based on horizontal conveyor operation. The engineering problems involved are


Dust Tight Weather-Proof Hood
Heavy Duty Combined Radial & Thrust Bearing
C. I. Bulkhead
Taper Pins Holding Stub Shaft
Triple Garlock Closure
Discharge Opening
Discharge Finger Paddle
Heavy Gauge Steel Flights
Fender Bulkhead
C. S. Machined Flanges, Feed Screw Connection
Triple Garlock Closure
C. S. Bulkhead with vents
Radial Bearings
C. I. Gear Box—Oil & Dust Tight
Steel Cut Motor Gears
Combined Radial & Thrust Brg. with Garlock Closure each end
Alloy Steel Shaft

Cutaway view of the elevator.

vastly different. In a horizontal conveyor the entire burden or load is carried in the conveyor box or housing and the spiral screw drags or load is carried directly on the helical flights, therefore, equilibrium must obtain between the acceleration of gravity, the rotational acceleration of the flights and the frictional resistance of the material, if stock is to be lifted at maximum capacity with lowest power consumption.

In the new Sprout-Waldron elevator these engineering problems have been coördinated. The entire load on the helical flights is lifted to the discharge and freed instead of part of it surging past the discharge and spiraling downward to make a circulating load as it does in ordinary vertical screws.

This company perfected the first vertical-screw elevator for handling bulk materials. With this new design, the field of its application is considerably widened. It is said to be unequalled for handling powder or granular products, and for meeting dust-tight, weather-proof specifications. It is being most successfully used for handling bulk cement, fullers' earth, finely ground and granular chemicals, flour and similar materials. It is not indiscriminately recommended for all materials. Its applications are being widened daily. To anyone with a problem of vertical elevation of materials, the Sprout-Waldron & Co., Muncy, Pa., offers its facilities to determine the possibilities of this unit for providing better handling equipment.

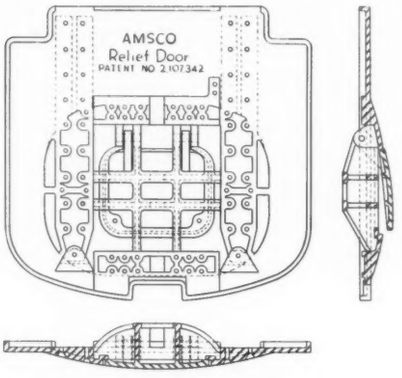
• Relief Door

A relief door for dredge and power-shovel dippers on which Patent No. 2,107,342 has been granted, is now being built by the American Manganese Steel Division of the American Brake Shoe & Foundry Co., Chicago Heights, Ill.

This relief door is designed to reduce the resistance encountered when a dipper is lowered into water. The new design permits water to enter through a small auxiliary door in the dipper door, operating in a similar manner to a flap valve. When the dipper is filled with material, the relief door is held closed.

The inside of the dipper door is slightly convex, the relief door forming the center portion of the curve. The outside of the main door has double ribs crossing the relief opening and supporting the relief door when it is closed. The hinges and latch mechanism are of the same construction and function the same as on an ordinary dipper door.

The construction of the Amsco relief door makes it particularly advantageous in excavating rocky material from under water; it overcomes the objection of the door being mate-



Relief door for dredge and shovel dippers.

rially weakened; the door being, in fact, even stronger regardless of the relief opening.

• Circuit Tester

A new circuit tester, Model 321, which applies only 50 microvolts and less than 1/1000 of an ampere to the circuit under test, has

Instrument which checks resistance of firing circuits.

been developed by the Triumph Mfg. Co., Chicago, Ill. The circuit tester is used to check the resistance of electric explosive firing circuits containing electric detonators or squibs. Pressure on the right contact closes the meter circuit through a standard No. 2 flashlight cell in the tester. Any external resistance up to 1000 ohms shunts the meter and causes the pointer to drop back to the scale mark indicating the resistance of the circuit under test.

• All-Steel Drill

The Star Drilling Machine Co. of Akron, O., announces the Star No. 75 Spudrill—a new all-steel drilling machine, with anti-friction bearings, free running reels, air-cooled brakes and a shockless spudder. It has a capacity to drill up to 3,500 ft.

In describing this machine, the *Star Drill* says: "It is a rugged machine, precision built of the finest materials available, designed for economical and efficient drilling, ease of op-

PERFORATED METAL SCREENS
FOR SAND, GRAVEL STONE, ETC.
Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
Prompt Shipment
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Telephone CANAL 1459

Portable, all-steel drilling machine.

eration, dependability in performance and long years of service. It is the result of extensive engineering research and experiment plus half a century of experience in building drilling machines. It is a new machine built to meet an insistent demand for a portable drilling rig capable of fast moving and quick rigging-up, efficient in operation and dependable in action.

• Excavator

The Speeder Machinery Corp., Cedar Rapids, Ia., announces the new ¾-cu. yd. convertible Model LS-80 shovel. This 19-ton machine has an electric-welded, alloy-steel lower base, positive steering, and traction lock controlled from operator's seat.

The new shovel has two speeds in traction and either 20-in. or 24-in. lug-type tracks or crawler tractor tracks available. All upper machinery is located behind an oversized center pin which cares for horizontal stresses. Four hook rollers riding on a large diameter turntable care for vertical stresses. There are two independently-mounted power drums and a positive, self-locking, worm-geared, two-speed boom hoist. Oversized clutches and brakes reduce heat to a minimum and prevent operator fatigue.

The machine is powered by an 80-hp. gasoline or Diesel engine and has a smart, heavy-gauge, streamlined cab.

"Flatjet" spray nozzle just placed on the market by Spraying Systems, Inc., Chicago, Ill., for washing sand, gravel and crushed stone. Spray is the flat type with uniform distribution. The nozzles are of sturdy construction, accurately machined and are available in male pipe connections from ¼ to ¾ in. and in capacities ranging from 1 to 20 g.p.m. at 40 lb. pressure. Standard stock construction is brass. Other metals can be specified.

• Blasting Agent

A new grade of "Nitramon" blasting agent to be called "Nitramon" No. 2 has just been announced by E. I. du Pont de Nemours & Co. The new grade has all the safety advantages of the regular "Nitramon" and is to be used in the same way as the regular grade.

The new blasting agent is slower than the regular grade. It is sufficiently sensitive for quarry blasting, and is particularly adapted to soft limestone and as a top load in harder material. Its density is great enough that it will sink in water holes and has a strength equivalent to 40 per cent. ammonia dynamite. Velocity is 10,000 ft. per sec.

"Nitramon" No. 2 will be packed in cans exactly like the regular grade cans except that the lids will be black with white letters to distinguish them. It will not produce headache from handling and the metal containers simplify loading where large quantities are used. Water resistance is indefinite provided the cans remain intact, and the blasting agent is non-freezing.

• Mixer

An open-pan mixer, the No. 3 Lancaster, is being marketed by the Lancaster Iron Works, Inc., Lancaster, Pa., for plants producing concrete products and ready-mixed concrete.

The mixer is a self-contained unit which may be had with a batch elevator hopper if desired. Operating levers and the discharge valve may be located as desired by the purchaser.

The mixing star can be equipped with three flexible plows or a combination of two flexible plows and one light, filled heavy straight side, or heavy bevel-side muller, as selected.

Suitable V-belt equipment or inclosed cut-gear reduction is furnished for direct motor drive. If belt driven, the mixer is equipped with a friction clutch pulley.

The No. 3 Lancaster mixer can be mounted on any substantial floor, mounted on masonry or concrete piers or upon a structural-steel frame.

• Dump Trailer

A trailer which for some time has been creating considerable interest in the sand-and-gravel and crushed-stone industry, is the Sanford-Day automatic bottom-dumping unit

HERE'S THE PIPE YOU WANT FOR

SAND AND GRAVEL LINES

By using Armco Dredge Pipe you can increase production, save on power bills, and reduce your replacement costs considerably. Here's why. Armco Dredge Pipe is made of special abrasion-resisting steel that *wears up to twice as long* as ordinary steel. It also boasts a higher tensile strength and a higher yield point. This together with its smooth interior and bottle-tight joints assures freedom from leakage, added flow capacity, less maintenance. Write for further information and prices. The American Rolling Mill Company, Pipe Sales Division, 3261 Curtis Street, Middletown, Ohio.

GAIN THESE MONEY-SAVING ADVANTAGES

- 50 to 200% Longer Wear
- Freedom from Leakage
- Added Structural Strength
- High Flow Capacity
- Low Handling Costs
- Lowest Cost Per Ton of Material Pumped

ARMCO

ARMCO DREDGE PIPE

The automatic-dumping trailer.

shown in the accompanying illustration. These trailers are built in 7- to 30-ton capacities, with simplicity of construction, fool-proof operation and ease of handling, being features of the unit.

The door operation is entirely automatic. A central dumping station is necessary, where clearance is provided for the doors to swing down to their wide open position. A simple device is placed at the side of the roadway at the approach to the dumping bin, and the door latch levers are raised when they come into contact with this device. Another device is placed at the exit end of the bin, in the middle of the roadway, and the doors are brought into their closed position by contacting this device as the trailer moves along. It is not necessary to bring the trailers to a full stop in dumping. For further information write the manufacturer, Sanford-Day Iron Works, Inc., Knoxville, Tenn.

• Yardage Counter

Counting the yardage hauled away, when the haulage fleet comprises trucks of various body sizes, is greatly simplified by a tally device being distributed by the George Haiss Manufacturing Co., New York, N. Y. It adds the cumulative yardage total by a simple movement of a dial indicator, and gives the user a useful check on his clam-shell crane's work.

Engineers have commented on the value of complete yardage tallies of this kind, as a cross-check on the calculation of firm earth yardage on which the estimates are based.

The front of the Haiss Totalizer also provides a daily tally of truck trips. The bakelite writing surface is easily cleaned off with a dampened cloth at the end of the day.

To make this "gadget" completely useful, the Haiss company has tabulated on the reverse side the total crane load of clam-shell buckets of various types including the rock, earth or other material handled.

This device is freely available to operators who write for it on their business letterheads.

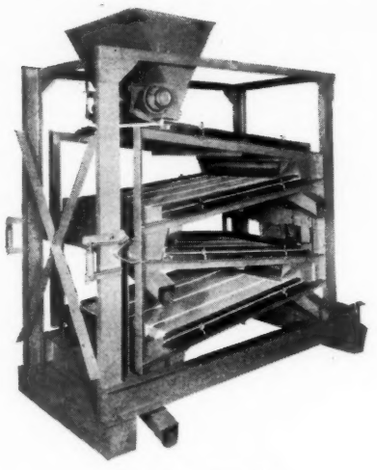
• Grader

The new Exolon multi-form grader was designed to provide high capacity, accurate, uniform sizing, splitting or correcting, for run-of-mill materials, from 4 mesh to 250.

Whether the need is for accurate close sizing, preliminary splitting, or correcting of final product, the principle applied to the new multi-form grader enables it to do the job quickly, accurately and with unfailing efficiency.

The unit pictured here, is fed a run-of-mill product, delivers three finished grades, or four, if the head feed is scalped. Additional units can be placed above, below or in series to provide any needed additional capacity. If desired, the material can be taken off in splits, rather than grades, at a greatly accelerated rate of speed.

The drive employed in accomplishing these results is a new development. It gives the screen a vibratory motion, which can be regulated in its throw to suit different grading requirements, by a simple adjustment of revolving weights within the drive. The compact construction of the screen itself, and our special method of suspending the screen in its frame, assure uniform transmission of these vibrations throughout the screen, and contribute to the uniformly accurate and rapid grading which this equipment produces.



New multi-form grader.

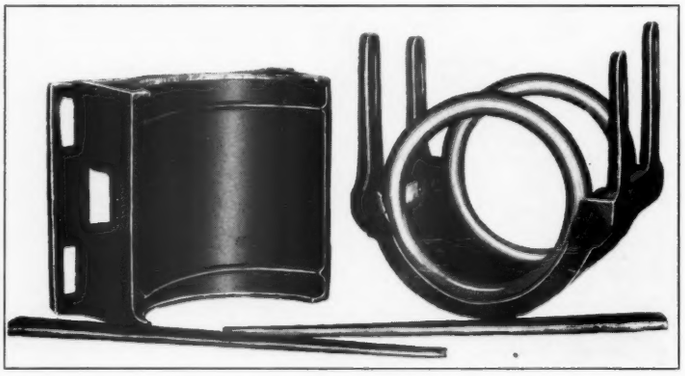
The grader is 6 ft. 6 in. long, 4 ft. 4 in. wide and 5 ft. high. The screen surface is 34 in. by 27½ in. It is being marketed by the Exolon Co., Blasdell, N. Y.

• Rubber Mountings

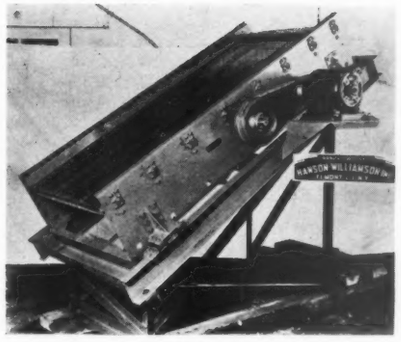
In the past, one of the noisiest pieces of equipment usually found in the sand-and-gravel plant was the vibrating screen. Sign language was often the only effective means of communication when in the immediate vicinity of one of these units. To-day, it is possible to carry on a conversation in the presence of the modern vibrating screen without

BACON
FARREL
CRUSHERS
Complete Plants Designed and Equipped.
Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment.
Engineering Service.

EARLE C. BACON, Inc.
17 John Street New York, N. Y.



Flexible pipe couplings, manufactured by the Fons Flexible Coupling Co., Royal Oak, Mich., are made in sizes up to 16 in., and are being used successfully in pits, quarries and mines, affording a simple, speedy method of connecting up pipe. They are threadless, of all-metal construction and flexible up to 40 deg., allowing free movement of the boat. Employing two keys in the larger sizes, the only tool needed to couple a joint is a hammer. According to the maker, they eliminate buckling, allow an immediate release of plugged lines, and cost less than rubber sleeves.



Rubber-mounted vibrating screen.

so much as raising one's voice—thanks to rubber!

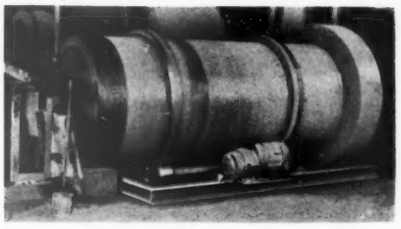
An outstanding example of this application is the vibrating screen manufactured by Hanson-Williamson, Inc., of Elmont, L. I., N. Y. This unit weighs approximately 1,000 lb. and handles a load of 400 lb. It has a vibrating frequency of about 1,000 vibrations per minute. The screen is mounted on eight 4-in. rubber mountings known as Vibro-Insulators. These mountings, which are a development of the B. F. Goodrich Co., are placed in pairs at each of the four corners of the screen. They are of the double-shear type and have a maximum load capacity of 50 lb. per in.

Use of these rubber mountings not only makes possible silent operation but eliminates any possible damage to the building structure due to excessive vibration.

• Classifier

Recent improvements in the Hardinge counter-current classifier present very definite advantages. Capacity has been increased for a given size of classifier volume by changing the shape of the spiral attached to the drum and with which it rotates, the spiral rolling the sands from the feed end to the oversize or discharge portion. Decreasing the height of the spiral in the settling zone and increasing it at the oversize end, greatly reduces agitation and allows handling of greater quantities of oversize. Thus increased capacity of both finished product discharged and oversize or sands delivered at the opposite end is obtained.

A change in the discharge arrangement that delivers the sands from the oversize end has raised the point of discharge nearly a third more than was previously obtained. Consequently when operating in closed circuit with a ball mill, a scoop feeder of ordinary diameter



Improved counter-current classifier.

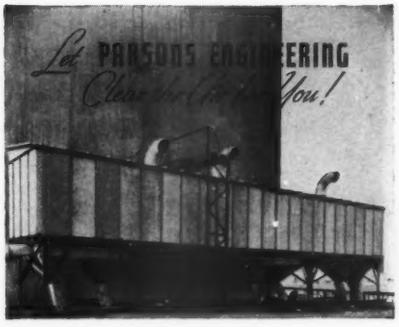
can be used instead of extra-size scoops formerly required when large circulating loads and high capacities were put through the system.

Other mechanical improvements include increasing the strength of the driving mechanism, and changing the method of attaching the tires to the drum, but it was not necessary to make any effort to increase the wearing qualities of the classifier because there was no appearance of wear whatever. In fact, examination of classifiers that have been running more than eight years showed that relining, or adding new flights, except for one short segment at the discharge end, was not required.

• Jack-Hammer Drill

The Ingersoll-Rand Co. has announced a new Jackhamer, the JA-35. It is a lightweight yet extremely powerful drill, styled after the widely used JA-45 and JA-55. It does a surprising amount of work per cubic foot of air used, and will readily handle all general light Jackhamer work with ease. It has "that extra power" when necessary to handle a job ordinarily done by a heavier machine.

In the above picture I. E. Baker (right), owner of the Laura Gravel & Stone Co., Phillipsburg, O., is shown receiving a prize check of $100 from J. E. Mereness, central district manager of Lima Locomotive Works, Inc. Mr. Baker won the award by naming Lima's new shovel, shown in the background, the "Paymaster." The contest was held at the 1938 conventions.



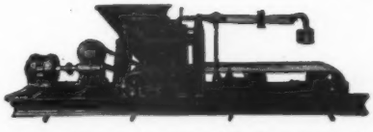
A 15-year record of repeat business would imply that sound Parsons engineering is worthy of *your* investigation, too. Parsons' patented oval bag principle, long life, low dust count and minimum maintenance enable Parsons Dust Arrestors to excel in the cement industry. Write for our Bulletin DA-6.

PARSONS

PARSONS
ENGINEERING CORPORATION
3597 E. 82nd St. • Cleveland, Ohio

MATERIAL weighted and proportioned with

99% Accuracy



Weighing and proportioning material with 99% accuracy, Schaffer Poidometers are recognized throughout the cement industry as important equipment in modern plant control.

Schaffer Poidometers are automatic in action and will operate continuously or, with a mechanical weighmaster attachment, will provide batch operation.

This efficient weighing equipment is now saving thousands of dollars throughout the cement industry. Many leading plants are now saving money while obtaining greater efficiency with Schaffer Poidometers. Let us help solve your proportioning and feeding problems. *Write for catalog No. 5.*

SCHAFFER POIDOMETER COMPANY
2828 Smallman Street Pittsburgh, Pa.

SCHAFFER POIDOMETERS

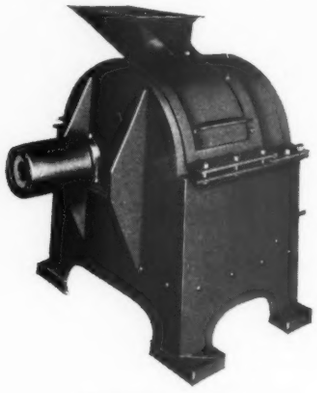
Weighing less than 35 lbs. it is an easy holding, fast drilling machine that finds application in coal and metal mines, in quarries, and on construction jobs. It is light enough for cutting hitches, trimming, taking up bottom, placing trolley hangers in a mine, popholing and still powerful enough for much general work.

The new JA-35 drill.

Descriptive literature on the JA-35, as well as other members of the Jackhamer family is contained in Bulletin 2433, copies of which may be obtained from the Ingersoll-Rand Co., New York, N. Y., or any branch office.

• Crusher-Grinder

A new heavy-duty combination crusher and grinder has been announced by Prater Pulverizer Co., Chicago, Ill. It employs a gradual reduction system. Materials entering one end of this grinder are first crushed by short hammers placed close to the shaft. Each succeeding row of hammers is longer, delivering progressively harder grinding blows. The cylinder, carrying the hammers, is in the form of a cone when in rotation. Unusual economy in power consumption and uniformity in sizing are claimed.



Hammer crusher.

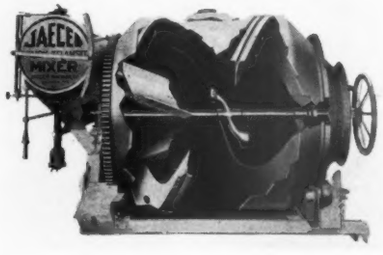
• Screens

Production has been increased 17 per cent. on the new line of Vibroplane and Angleplane screens, according to a report by Wayne Belden, vice-president and treasurer of the Ajax Flexible Coupling Co., Manufacturers, Westfield, N. Y.

"We attribute the demand for these screens to their closer, more accurate separations, increased capacity per unit of screen area and freedom from blinding, which are important factors in maintaining quality control on a production basis in the wide range of industries where correct analysis is an essential factor in securing uniformity of processing," stated Mr. Belden.

One of the interesting developments which makes possible their smooth operation is the balanced action of the Ajax-Shaler reciprocating drive unit. It operates on the principle of two weights geared together and rotating in opposite directions. When the weights pass each other twice during each revolution they impart a reciprocating motion directly to the screen box. This eliminates the introduction of conflicting forces set up when driving power is applied against the frame of the machine.

These Ajax screens are made in various standard types providing a wide range of single- and multiple-deck models to suit requirements.



Claiming the biggest basic truck-mixer improvement in years, the Jaeger Machine Co., Columbus, O., is announcing its 1939 models to the trade. Features include "sypho-meter" water control, dual revolving water sprays, continuous spiral mixing blades and double throwback reversing blades. According to the maker, the 1939 model water control is accurate within a fraction of 1 per cent. with a full tank under any condition.

• Oil Reclaimer

Any plant operator can reclaim lubricating oil which has been drained from the crankcases of tractors, shovels, trucks or power units with the new Bucyrus oil reclaimer, it is announced by Bucyrus-Erie Co., Milwaukee. Up to 90 per cent. of average crankcase oil may be recovered at an overall cost of about 9 c. per gallon, the manufacturer states.

The quality of the reclaimed oil is declared to be "even better than that of the new oil originally put into the engine." Weaker and unstable parts of the oil have been broken down by heat and friction, and all wastes have been completely removed, it is explained.

INCORPORATIONS

La Grega Sand & Gravel, Inc., Corona, N. Y. Capital $10,000. Correspondent: Gellman & Gellman, 40-03 National Ave., Corona.

Grant-Pacific Rock Co., Fresno, Cal. 2,000 shares n.p.v. common stock. Incorporators: N. D. Rowley, W. A. Palmer, O. A. Rohlf, Garret McEnerney and Justin M. Jacobs, all of San Francisco.

Bituminous Rock Co., Cincinnati, O. 300 shares n.p.v. common stock. Incorporators: Charlton Wilder, C. A. Schroder, Robert L. Black, Blymer Bldg.

Gentry-Thomas Gravel Corp., Kokomo, Ind. 1,000 shares n.p.v. common stock. Incorporators: Fred E. Thomas, John H. Gentry, Harold Little.

Eden Gravel Plant, Inc., Greenfield, Ind. 100 shares $100 par value common stock. Incorporators: Raymond Hooton, Harold F. Hooton and Edwin H. Reed.

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Trade Literature

Goodyear Mechanical Rubber Goods. 56 p. Goodyear Tire & Rubber Co., Akron, O.

Standardized Stock Speed Reducers and Flexible Couplings. 176 p. (Catalog No. 150) D. O. James Mfg. Co., Chicago, Ill.

The KRW Industrial Power Unit. (Folder) K. R. Wilson, Buffalo, N. Y.

A New Discovery in Concrete Products. 8 p. Glaze-Crete Corp., Pittsburgh, Pa.

How to Join and Repair Pipe. 12 p. S. R. Dresser Mfg. Co., Bradford, Pa.

Portable Crushing Plants. (Series of folders) Universal Crusher Co., Cedar Rapids, Ia.

Vibrator 48-V Duplex Crushing Plant. 8 p. Pioneer Engineering Wks., Minneapolis, Minn.

Type H Blake Jaw Crusher. 16 p. Traylor Engineering & Mfg. Co., Allentown, Pa.

Plat-O Heavy-Duty Vibrating Screen. 12 p. Deister Machine Co., Fort Wayne, Ind.

Good Low Cost Roads. 36 p. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Announcing Lehigh Mortar Cement. 4 p. Lehigh Portland Cement Co., Allentown, Pa.

Four New Rotex Screens. 4 p. Orville Simpson Co., Cincinnati, O.

Smootharc Welding Electrodes. (Bulletin R-5) 28 p. Harnischfeger Corp., Milwaukee, Wis.

Hardinge Thickeners and Clarifiers. 4 p. Hardinge Co., York, Pa.

The new wire-rope plant located at Muncy, Pa.

Important Steel Maker Enters Wire-Rope Field

In its program of expansion, the Jones & Laughlin Steel Corp. has entered the wire-rope market with a new, modern plant and with every machine a precision machine incorporating the newest advances in engineering.

This new plant will be known as the Gilmore Wire Rope Division of the Jones & Laughlin Steel Corp. Robert Gilmore, a leader in the wire-rope industry, who is general manager of this division together with

Robert Gilmore, general manager.

his engineers have recognized the need for entirely new precision machines to meet present-day demands. Mr. Gilmore has devoted his entire business life to the development and manufacture of wire rope.

The new plant is indicative of an expansion and development program carried on by "J & L" under the direction of H. E. Lewis, its president, who says:

"The entrance of J & L into the manufacture of wire rope enlarges considerably our opportunity for satisfactory return on raw materials and for better operations of our rod and wire mills.

"The plant at Muncy, Pa., is new in every respect and incorporates features for the manufacture of products having superior qualities that will assure our immediate participation in all major markets for wire rope.

"In Robert Gilmore, general manager, we have an outstanding leader in the wire rope industry to head this new division."

John A. Roeblings' Sons Co. has established a branch office and wire-rope warehouse at 855 North Ave., W., Pittsburgh, Pa.

Acquires Safety Sling Firm

The Broderick & Bascom Rope Co., St. Louis, Mo., has purchased the business and patents of the Murray Safety Sling Co. of Pittsburgh, Pa. D. Murray, the original manufacturer of plaited wire-rope safety slings, will himself join the company, and will be in charge of the Murray Safety Sling Division factory at 33 Water St., Pittsburgh.

Books Worth Reading

INDUSTRIAL MINERALS AND ROCKS, *published by the American Institute of Mining & Metallurgical Engineers, 29 West 39th St., New York, N. Y. 955 p. Price $6.00.*

Here is a veritable encyclopaedia of the nonmetallic-minerals industry. To owners of deposits and to those who purchase, process, fabricate or market these minerals this volume will be certain to prove useful. Although each chapter has been written on assignment by a specialist on the subject, skilful editorial coordination has given the book a high degree of unity and coherence. Chapter headings are as follows: Abrasives; Asbestos; Barium Minerals; Bauxite; Bentonite; Bleaching Clay; Borax and Borates; Cement Materials; Chalk; Chromite; Clay; Crushed and Broken Stone; Diatomite; Dimension Stone; Feldspar; Fluorspar and Cryolite; Granules; Graphite, Gypsum; Heat and Sound Insulators; Iceland Spar and Other Crystals; Lime; Lithium Minerals; Magnesite; Manganese; Mica; Mineral Fillers; Monazite; Native Bitumens; Nitrates; Phosphate Rock; Potash; Precious Stones; Pumice and Pumicite; Refractories; Salt; Sand and Gravel; Sillimanite Group; late; Sodium Carboate and Sodium Sulphate; Special Sands; Strontium Minerals; Sulphur and Pyrites; Talc; Soapstone and Pyrophyllite; Titanium; Tripoli.

A DESCRIPTIVE PETROGRAPHY OF THE IGNEOUS ROCKS, *by Albert Johannsen, Ph.D. Published in four volumes by the University of Chicago Press, Chicago, Ill. Prices: Vols. I, III and IV, $4.50. Vol. II, $5.50.*

The author, professor of petrography at the University of Chicago, has completed the most comprehensive treatise on the subject ever published. The first volume describes the textures and structures of rocks, containing a summary of the various classifications. There is an extensive glossary of petrographic terms, with bibliographic references and tables for calculations. Volume II is confined entirely to the quartz-bearing rocks, defining the various rock families with a history and explanation of their characteristics. In Volume III the intermediate rocks are described, including those of the syenite-diorite-gabbro series and their extrusive and hypabyssal equivalents. The fourth volume covers the feldspathic rocks, the peridotites and perknites.

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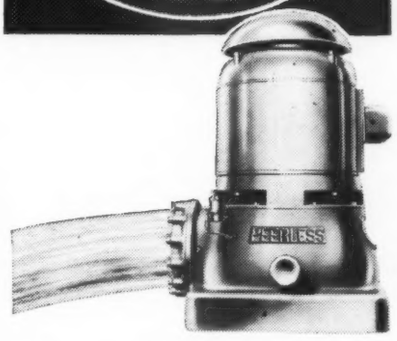

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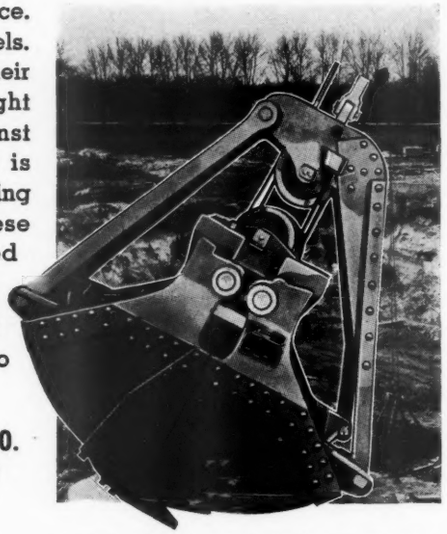

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PROFITABLE NEW PRODUCTS

Special Section

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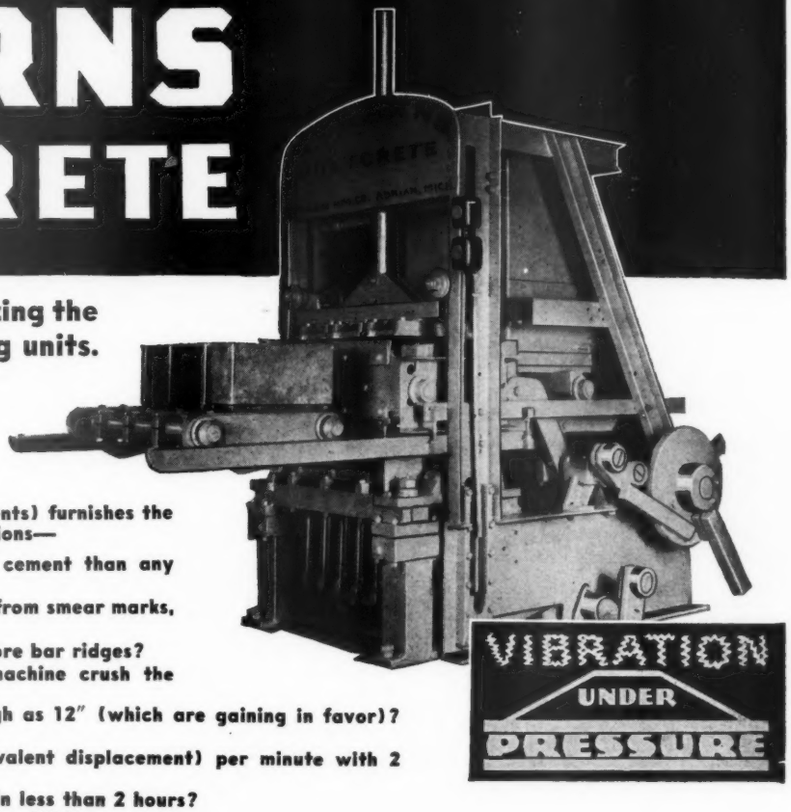
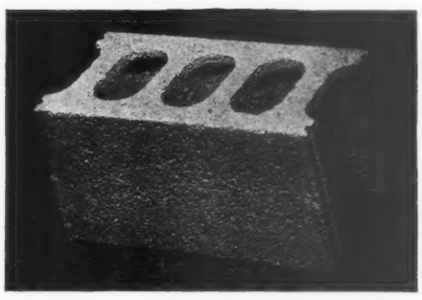


—the machine that is revolutionizing the manufacture of concrete building units.

It's not a press—not just a vibrator feeder—but a machine that vibrates the concrete in the mold box while it's under pressure — subjects it to 7200 packing blows per minute!

This machine (protected by broad, basic patents) furnishes the most favorable answers to the following questions—

1. **Will it make more good block per bag of cement than any other machine?**
2. **Will the block face textures be uniform, free from smear marks, and planes of weakness?**
3. **Will the block tops be smooth and without core bar ridges?**
4. **If I use light weight aggregate will the machine crush the particles?**
5. **Will it make units as long as 24" and as high as 12" (which are gaining in favor)? And brick?**
6. **Will it make nine 8x8x16-in. block (or equivalent displacement) per minute with 2 men at machine?**
7. **Can it be changed from one size to another in less than 2 hours?**
8. **Will the cost of all replacement parts be under $250 per year?**
9. **Is this general type of machine likely to be obsolete soon?**



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No machine ever before produced units like this—every one smooth, dense, clean cut, true to dimension. Stearns Joltcrete Blocks established a new standard of value. They'll build a new and more profitable business for you. Write for full particulars.

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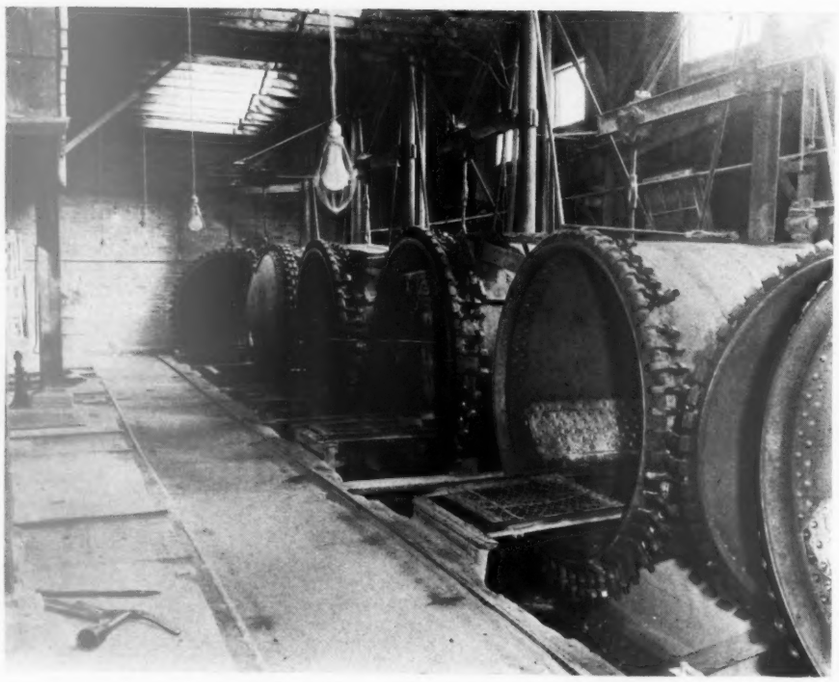
Complete Concrete Products Plant Equipment—Power Strippers, Clipper Strippers, Mixers, Skip Loaders, Brick Machines, Manhole Block Machines and Straub Oscillating Attachments.

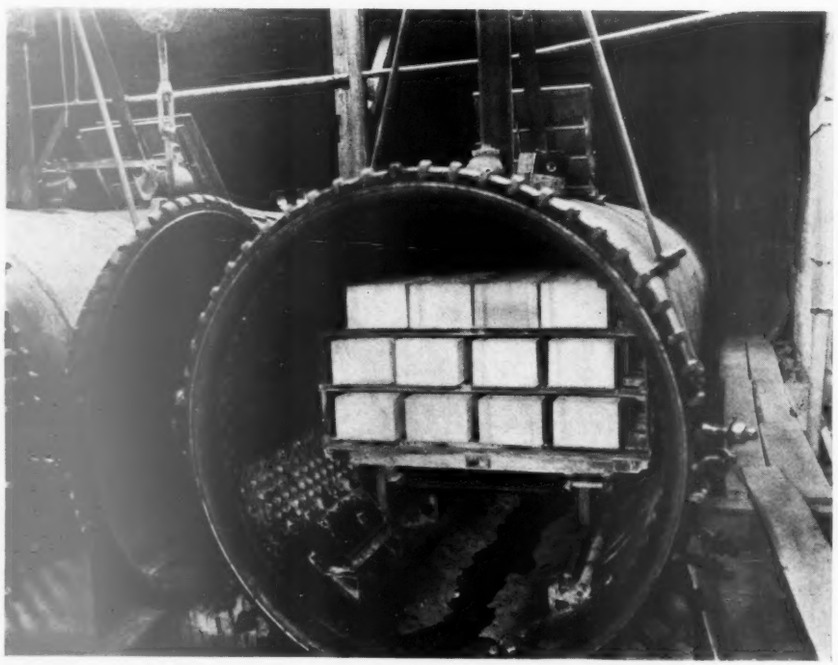
PROFITABLE NEW PRODUCTS

By HARRY F. UTLEY

High-Pressure Steam Kilns Reduce Curing Period from Days to Hours



The six high-pressure curing kilns with bolt-on ends.



Looking into one of the kilns loaded with blocks on racks.

DURING the first half of this year business with the Michigan Pressed Brick Co., Detroit, Mich., had not been particularly encouraging. Engaged exclusively in the manufacture of sand-lime bricks and blocks over a period of 30 years, this company's $100,000 plant less than three months ago turned to the manufacture of high-pressure steam-cured concrete blocks and the plant has since been a hive of activity. An average of 4,500 of these units is being turned out daily in addition to the sand-lime brick production, builders readily paying a premium of 1 c. per block for these modern cured units above the price of the conventional concrete block.

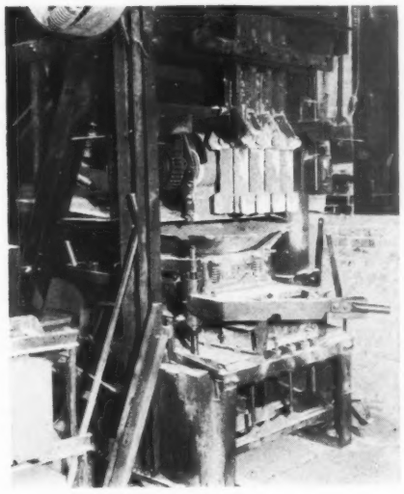
Cured at 350 deg. F. under 120 lb. of steam pressure, these concrete blocks attain an average strength of 2,000 lb. per sq. in. in less than 8 hr. after they leave the stripper, substantially stronger and subject to considerably less volume change than ordinary concrete blocks, which are moist-cured for 28 days at normal temperatures. In most cases the units are removed from the kilns and loaded on trucks for shipment to the job almost at once, often still uncomfortably warm for handling!

The plant of the Michigan Pressed Brick Co. is located only a few miles from downtown Detroit and aggregates are brought in by trucks, being purchased from Wayne County pits. Undercover storage is provided, a belt-conveyor carrying the sand and gravel to the mixing floor of the plant proper. Cement and lime are taken up by bucket-elevators. In batching and mixing the concrete the regular Jackson & Church equipment used for sand-lime-brick production is employed; the aggregates and cement are automatically proportioned by rocker feeders on the Volumeter, which discharges into a rod-mill where the mixing takes place. A small amount of lime, not exceeding 5 per cent., is added to the mix to improve workability and the color of the blocks. A large Besser automatic stripper, recently purchased, is used to form the units. Off-bearers place these on racks on transfer cars, which are pushed into the kilns as soon as they are loaded.

There are six Jackson & Church kilns, or hardening cylinders, where the units

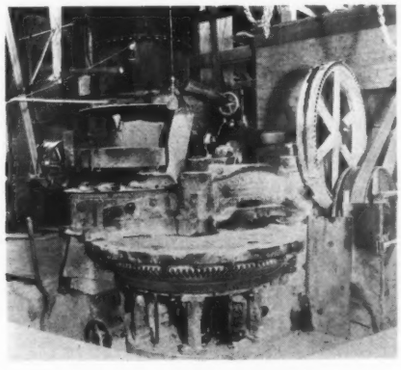
are cured with live steam under 120 lb. pressure. Two of these are 6 ft. in diameter and 56 ft. long; the remaining four are 6½ ft. by 60 ft. After loading the kiln ends are firmly bolted shut, the steam is turned on, and a relatively short while later, usually 7½ hr. according to Joshua Finkbeiner, general manager, they are removed, completely cured and ready for use. Tests are made regularly by the City of Detroit Testing Laboratory and strengths as high as 2,300 lb. per sq. in. are often recorded with about 1,900 lb. the minimum. The Detroit building code requires but 750 lb. per sq. in. and architects and engineers have been quick to accept these supremely strong and fine-appearing units.

At the time of the writer's visit to this plant, J. Morley Zander, general manager of the Saginaw Brick Co., Saginaw, Mich., dropped in for a friendly call. Mr. Zander's plant is also

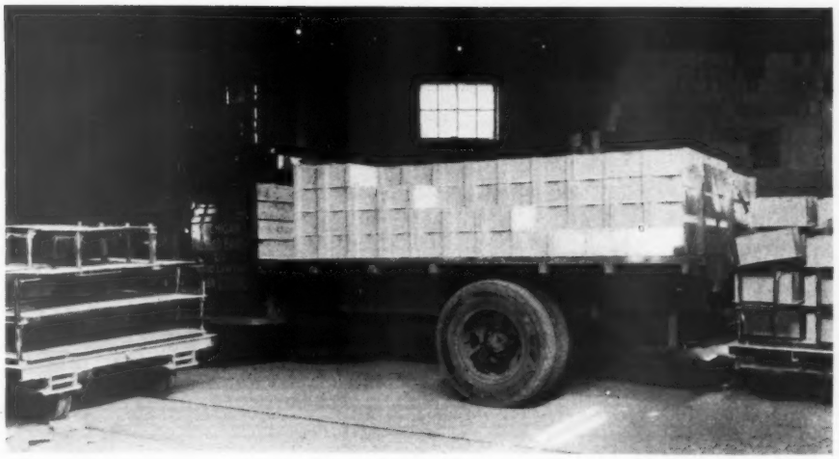


One of the strippers used to form cement and sand-lime blocks.

producing high-pressure steam-cured concrete blocks by the same process and he has done considerable pioneering in this field. Readers who attended the concrete conventions at Chicago last winter may recall his interesting talk on the subject. Mr. Zander pointed out



The sand-lime-brick press.



Loading a truck with freshly-cured units. Note rack-load of blocks direct from kilns at right.

that the high temperatures and high pressures developed in this relatively-new method of curing complete the hydration of the cement and thus eliminate one of the principal causes of volume change, at the same time allowing the use of a smaller quantity of cement to produce a given quantity of product. Experience has shown also that if these units are laid in a wall in the same dry condition in which they come from the kilns, there will be no volume change under constant temperature and humidity conditions, thus eliminating cracking. The units themselves are practically waterproof.

Just how much cement can be saved by high-pressure steam curing can only be determined by trial, the few producers in this field being reluctant to be quoted. Chemically, however, when the Portland cement hydrates in the mix, some calcium hydroxide is released. In ordinary air-curing this calcium hydroxide probably reverts to calcium carbonate in time. Calcium carbonate in so small a quantity can contribute very little to the strength of the product. In high-pressure steam-curing, however, this calcium hydroxide combines with the fine silica present in the aggregate to form calcium silicate, which is nearly insoluble and provides bonding qualities of high strength. The calcium silicate supplements the Portland cement in the mix and less cement is therefore required to attain a definite strength. Or, simply stated, with high-pressure steam-curing the Portland cement is more completely used.

Both Mr. Finkbeiner and Mr. Zander seem satisfied that only through the production of an engineered product, such as is manufactured by high-pressure steam-curing, can the confidence of the building industry in concrete masonry be increased. When building codes become extremely rigid and allow the use only of a quality product, more of these plants will be established. The elimination of the "back-yard" producer whose output is usually unacceptable to reputable builders will result only from the establishment of higher standards and open the way for plants such as this one in Detroit. The rather high investment in equipment will then be better justified and cut-throat competition and price-cutting, which are usually started by the hit-or-miss operator, will diminish or cease entirely.

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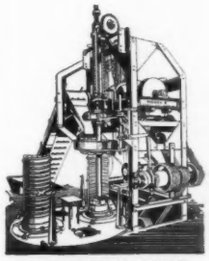
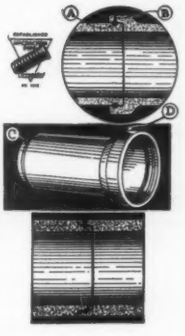




CONCRETE PIPE MACHINERY CO., SIOUX CITY, IOWA

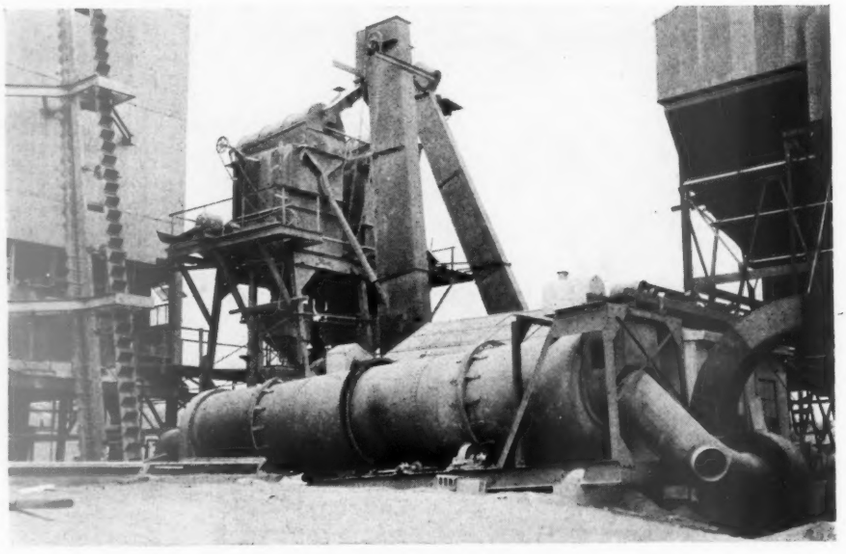
PROFITABLE New PRODUCTS

Pioneer Massachusetts Crushed-Stone Producer

OPERATES HUGE PLANT FOR BITUMINIZING

A view of the Old Colony crushed-stone plant.

Aggregate-bituminizing plant with dual-batching unit in center.



Close-up view of the new drier at the bituminizing operations.

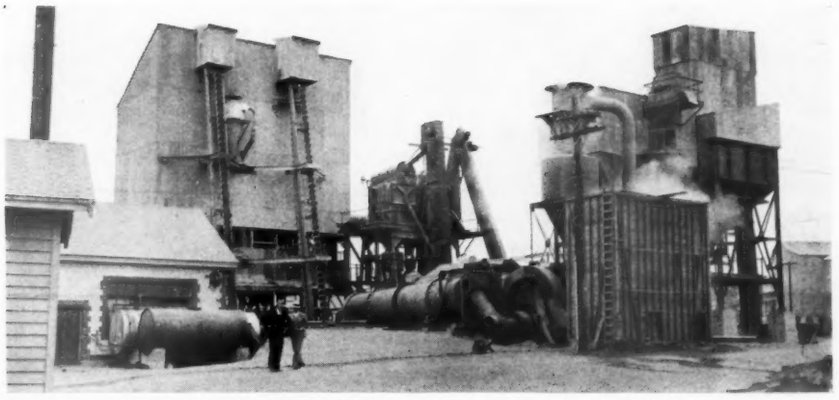
THE Old Colony Asphalt Concrete Co. is one of the newest producers of bituminized aggregates in New England and is also the largest. This company was formed late in 1937 by a consolidation of the Bituminous Paving Products Co. and the Weymouth Asphalt Concrete Co. The former company had operated on the property of the Old Colony Crushed Stone Co. at Quincy, Mass., for ten years and was taken over by officers of the crushed-stone company in 1937. After the consolidation the Weymouth plant was moved 5 mi. from its original site to the quarry property. The entire set-up was arranged to combine all this equipment at one location and considerable new machinery was purchased. The Weymouth plant is a Warren Bros. plant and this company also supplied the new equipment. The total capacity is now over 1,500 tons daily.

The old plant on the Old Colony property was formerly used only for the production of cold-mixed materials. This was and still is a dual plant with two separate complete sets of equipment in one building. One section of the plant has not been changed and is still used only for making cold-mixed material. The other section has been improved and a new mixer and drier and other equipment have been installed. Any type of bituminous mixture, hot, cold or intermediate, can now be produced in the old plant. The Weymouth plant has been used only for hot mixtures, but can also be used for other types if desired. With the combined equipment Amiesite, Laykold and any type of hot mixture can be mixed at one time. Laykold is mixed at a temperature of 225 to 250 deg. F. and hot mix at 275 to 350 deg. F.

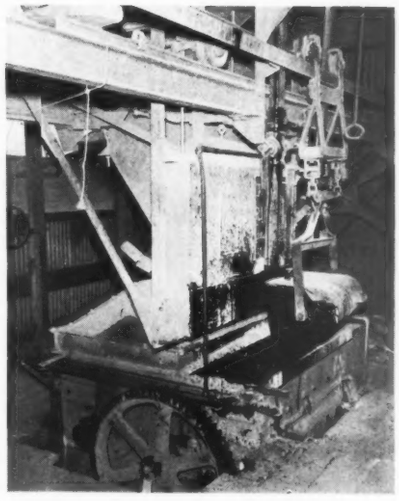
Two overhead cold-aggregate storage bins having total capacities of 100 tons each are employed to feed the Weymouth plant and that section of the old plant used in the production of hot mixtures. One of these bins is for sand and stone screenings and has two compartments; the other bin is for stone and has compartments for three sizes. The aggregates stored in these 100-ton bins is dumped from trucks into steel hoppers, from which steel-inclosed ele-

By W. E. TRAUFFER

AGGREGATES



Another view of the aggregate-bituminizing plant with boiler-house at left, new wet dust-collector box at right.



Aggregate batcher and bitumen bucket which feed the 1-ton mixer in the cold plant.

rators transfer these materials into their respective compartments in the bins by means of selective chutes.

Two parallel horizontal belt-conveyors operate under these bins. One conveyor supplies the hot section of the old plant and the other supplies the Weymouth plant. A Jeffrey-Traylor vibrating feeder suspended under the sand-and-screenings cold-storage bin discharges into two pairs of pants chutes with flop gates, which can be set so that either one of or both these materials can be discharged on either one of or both the belt-conveyors. The desired sizes of stone are discharged through gates from their respective compartments of the other cold-storage bin on these same belt-conveyors. With this arrangement each plant is entirely independent of the other.

One of the conveyors discharges into a new 66-in. by 30-ft. Warren Bros. direct-heat rotary drier serving the hot section of the old plant. A Sturtevant Size 60 fan is connected to this drier and discharges into a dust washer. This drier is oil-fired by two Hauck burners. The dried material is taken by an elevator to a 3-deck vibrating screen with ½-, ⅜-, and ⅛-in. openings. The four separations of aggregates produced by this screen are discharged into four 25-ton bin compartments from which gates feed them into a Warren batcher with a Howe dial scale. Bitumen is weighed in a steam-jacketed bucket with a Howe beam scale. These ingredients are discharged into a new 2-ton Warren mixer from which the mixture is discharged into trucks. This plant arrangement is used when making hot or intermediate mixtures. When it is desired to produce cold-mixed material the stone and dry screenings are discharged into hoppers which serve the same elevator which takes the dried materials from the drier. Apparatus for handling filler dust to the 2-ton mixer is being installed.

The other horizontal belt-conveyor under the bins supplies the 56-in. by 20-ft. Warren rotary drier of the Weymouth plant. This drier is oil-fired by two burners. A No. 45 Sturtevant fan connected to this drier discharges to the dust washer already mentioned. An inclosed elevator is employed to handle filler dust in this plant. The dried materials are elevated to a pair of Warren revolving screens, each with 9/16-, 5/16-, and ⅛-in. openings. The four sizes produced by these screens are stored in two separate 4-compartment bins, each serving a 1-ton weighing batcher with beam scales. Both these batchers feed on opposite sides of a 1-ton mixer. Bitumen is weighed in a dump bucket with a dial scale. With this arrangement it is possible to run alternate batches of two types of mixture from the Weymouth plant.

For the cold-mixed section of the original plant stone and dry screenings are dumped separately from trucks into a hopper. A bucket-elevator transfers these materials through a selective gate into separate bins. The aggregates are batched in a weigh-box with a 4-beam scale. Bitumen is measured in a tip-type bucket also equipped with a beam scale. These ingredients are discharged into a 1-ton mixer from which the finished cold mixture is discharged into trucks.

The company specializes in the manufacture of Laykold, a patented mixture of the American Bitumuls Co., and sells mainly to the state, counties, cities, towns, etc. Some contracting is also done, and a 1,053-ton job at Bourne on Cape Cod has just been completed. Some stabilized-soil base material has also been produced.

The dust washer connected to these plants consists of a large wooden box-like structure having two compartments. The blowers discharge into their respective compartments at the bottom of the washer. A series of spray nozzles settle out the dust and the pressure of the blower forces the air up through a saturated bed of coke 6 to 8 in. thick. Above this is another series of sprays and another coke bed and at the top is a third series of sprays. By this time the air is entirely clean and is exhausted to the atmosphere. The dust settled out is washed off the sloped bottom floor into a 6-in. pipe through which it is wasted.

Bitumen is received in cars or trucks and is pumped into two 25,000-gal. vertical cylindrical Hot Spot tanks and a 20,000-gal. horizontal tank. All these

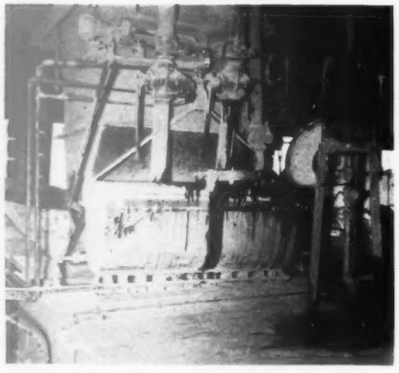
Dual vibrating feeder which discharges sand and screenings through split chutes to conveyors feeding driers.

tanks have steam coils for heating to about 300 deg. F. Three pumps are used to feed the bitumen from these tanks to the plants and they are so arranged that any pump can feed from any tank. A pressure of 50 lb. is kept on the line at all times. The Laykold bitumen is stored in a separate 12,000-gal. tank and has its own pump. The tempering fluid used in making Laykold is stored in a 15,000-gal. tank. An Erie City 100-hp. boiler with a Ray oil-burner supplies steam for all operations. All condensation is returned to a receiving tank and is filtered before being returned to the boilers.

Bunker A fuel oil for the two driers is stored in a 2,000-gal. tank and is preheated to 200 deg. F. before it is pumped to the burners. The oil for the boilers is stored in a 3,000-gal. tank which is also equipped with heating coils.

The history of the Old Colony Crushed Stone Co. is really the history of E. R. Atwood, treasurer and general manager, who is also treasurer of the asphalt company. Mr. Atwood came to Quincy in 1902 and rebuilt a small crushed-stone plant at this same location. Many improvements and enlargements were made until 1926, when the present crushed-stone plant was erected. A renovation program involving considerable new equipment has just been completed at this plant. A new re-screening system was installed to augment the production of ¼-in. stone. A brief description of this 250-ton-per-hr. plant follows:

The stone in this deposit is a cross between a granite and a trap rock. A 70-ft. face has been developed and drilling is done in three ledges with Ingersoll-Rand tripod drills. Hercules explosives and Ensign-Bickford Primacord fuse are used. Stone is loaded by



The aggregate-weighing batcher with dial scale and bitumen bucket which feeds the new 2-ton mixer.

two Marion Type 37 steam shovels with 2-cu.yd. dippers into three Mack 6-ton trucks, each pulling a trailer made from an old Packard truck. A new Shepard-Niles electric hoist has been installed to dump these trucks into the 48-in. by 60-in. Allis-Chalmers primary jaw crusher. A belt-conveyor carries the product of this crusher to two 16-in. Allis-Chalmers gyratory crushers. The product of each of these crushers has its own independent circuit. Separate elevators

Left to Right: E. R. Atwood, treasurer; W. B. Slemmer, vice-president of Warren Bros. Roads Co.; A. S. Cassese, asst. treasurer.

carry the crushed rock to separate Robins scalping vibrating screens. Oversize from the screen at the north end of the building goes to a new No. 10 Allis-Chalmers Newhouse crusher and the oversize from the south screen to a No. 10 Allis-Chalmers McCully gyratory crusher. In each circuit the material passing through the scalping screen and the crusher product are discharged to separate elevators.

The elevator from the south screen discharges the stone into a revolving screen which makes several finished sizes. The throughs, minus ¾-in., go to two Allis-Chalmers Aerovibe screens for fine sizing. The south elevator from the No. 10 McCully crusher feeds an Allis-Chalmers 2-deck Type B screen followed by a second similar screen. These screens make several finished sizes of stone. The fine stone, minus ⅜-in., passing through the second screen goes to a Niagara screen for final separation.

The minus 1¼-in. material passing through the north Robins screen is carried by two elevators in a series to a new Allis-Chalmers 5-ft. by 14-ft. 2-deck Low Head screen. This produces several finished sizes of stone. The minus ¾-in. material passing through the screen goes to an Allis-Chalmers 2-deck Aerovibe screen for final sizing.

The product of the No. 10 Newhouse crusher at the north end of the building goes to an elevator feeding an Allis-Chalmers 4-ft. by 6-ft. Type B screen. The material passing through this screen goes by elevator to an Allis-Chalmers 4-ft. by 10-ft. Type B screen for final sizing. The 1¼-in. plus material retained on the first screen is discharged to the elevator feeding the Low Head screen already mentioned. An arrangement has also been made whereby the contents of several of the storage bins can be fed to a No. 7 Newhouse crusher or a No. 6 McCully crusher. The product of these crushers is carried on a belt-conveyor to the elevator, which takes the product of the No. 10 Newhouse crusher located at the north end of the plant.

The bin structure has 26 compartments of 75-ton capacity each. Usually 9 sizes of stone are stored. Cars are loaded on two tracks under these bins and there is track space for gravity feed of 35 cars to the plant. These cars run back in on the main line below the plant. Trucks are also loaded under the bins.

Note Renewed Interest in Natural Firebrick

Considerable interest has attached recently to a refractory brick known in the trade as "firestone". This is not a synthetic product, but a natural sandstone shaped to the required dimensions. Firestone is obtained chiefly in the famous sandstone area of northern Ohio. The best beds for it are 100 to 200 ft. below the surface. The silica grains are subangular and are cemented together in nature with amorphous silica together with small quantities of iron and alumina compounds. The resulting structure is rather open and porous, permitting expansion and contraction with the minimum of spalling at high temperature. Its crushing strength is 8,000 to 10,000 lb. per sq. in., modulus of rupture 1,200 to 1,400 lb. per sq. in., and apparent specific gravity about 2.14.

Sandstone was used for lining the first furnace erected west of the Allegheny Mountains in 1802 and was employed in many furnaces in the early days of the iron-and-steel industry. With the introduction, about 1865, of silica brick made of crushed ganister and lime, the use of the natural stone declined. When it was found later that carefully selected natural sandstone had superior qualities for resisting high temperature and abrasion, the demand increased and production of firestone has become an important branch of the activities of some Ohio sandstone mills. The principal applications are for lining soaking pits, Bessemer converters, blast furnace car ladles, mixers, the melting zone of gray iron cupolas, and foundry crane ladles, according to Oliver Bowles, of the U. S. Bureau of Mines.

Posing beside one of his newest machines, the "stubborn Dane" himself. In the concrete-products business for 32 years, he has been an outstanding success.

Making a Dependable Product, Plus Good Salesmanship, Keeps "Pete" Nelson Forging Ahead

THIS is a story about salesmanship in the products business. It's about A. P. Nelson of Spencer, Ia., head of the Spencer Concrete Block Works. They call him "Pete". He came over from Denmark at the age of 16. When 18 years old, he got a contract to build a brick building in Spencer, a two-story building.

That was the start. He made his first concrete blocks in 1902 which was before many of the men most prominent in the business to-day were born. Since then he's made and sold over 3,000,000 blocks and has learned a lot about making good blocks and about selling them. He was the first man to lay a concrete-block manhole in the Chicago area; he sold 216 carloads of 2,500 blocks each in 1923 and 1924; made them on a machine built by Gene Olsen. In six years, from 1923 to 1929, he built 368 mi. of concrete sidewalk in Chicago and suburbs.

There's nothing spectacular about Pete's methods. Being what he terms "a stubborn Dane", he insists on making a good product. He was one of the first products men with the foresight to see that until blocks got respectable enough to show their faces above grade products manufacture would remain a basement business. So he made the best blocks he knew how to make and he let people know about them. Also he was one of the first products manufacturers to arrive at the conclusion that if clay bricks could be shipped long distances, so could concrete blocks.

"I always used the best machinery I could buy", reminisced Mr. Nelson. It was in the Sherman Hotel at the recent Concrete Industries Exposition. "My first blocks were 8 in. by 24 in. and 6 in. high, with three cores. I made 'em on a Clipper machine that I bought over in Webster City. After that I used a Brandell with a Kramer tamper, then a Hayden with an Anchor tamper. We just made rock-face blocks up to then.

"Charlie Bradley came down from Rock Rapids and showed me those Anchor 2-piece wall blocks, so I started making them. In 1915 I added a Hobbs and when the stripper block was introduced I made them on a Hayden; they were 8 in. by 8 in. by 20 in. In 1918 I was running 10 Hobbs machines under 10 Anchor tampers. Later I got a couple of Universal machines and I'm still operating them. But my main production is made on a Stearns power stripper. You see, I've used a lot of machines, always what I thought would make the best blocks at a reasonable cost.

"We pump our own gravel, grade it and screen it. We cure with water and warm air. Our blocks test 1,800 lb. gross; test cylinders go 5,000 lb. We make concrete joists, too—the Kahlman type—and the concrete used in them tests above 6,000 lb. Most of our concrete is mixed in an 18-ft. Stearns. Some of the wet mix is produced by a Jaeger."

Spencer is a city of 6,000 people and you have to travel 18 mi. to Graettinger to find the next block plant. Pete started shipping his product out of town in 1912. There weren't so many block plants then, and not all those that were operating made first-class blocks. So Pete got it into his Danish head that if he could make a good block and offer it at a fair price, it could be sold through the regular building-material channels. He loaded some specimen blocks in his car and started out. He showed his product to local lumber dealers, offered to sell through the dealer. Sometimes he made a deal, sometimes he didn't. But in any case, *he so'd his blocks!* If the dealer wouldn't handle them, he sold direct. He offered his product to

Mr. Nelson's fleet of trucks, besides making speedy, economical deliveries, is an invaluable advertising asset. Painted yellow and black, they are always kept clean and attractive.

The tile-making machine turning out small-diameter units.

one dealer in a town not far from Spencer. The dealer looked out the window to a shed covering six carloads of clay products he had just put in stock and said he guessed he wouldn't handle concrete blocks. Pete sold 12 carloads of blocks in that town in the following six months, shipping direct to contractors.

In 1920 Nelson concrete products were being sold by 124 lumber dealers in Iowa, Minnesota and South Dakota. The longest haul was 300 mi. by railway to Armour, S. D. That was nearly two decades ago and a lot of other good block plants have been established in that time. So Pete now confines his operations to a 100-mi. radius, reaching all his customers by truck. Last year five out of every six blocks he made were sold outside his home city.

How does he do it? By making a good product, keeping a large inventory, and advertising. He has two salesmen on the road and he advertises in newspapers, but says his best medium is his fleet of 7 Chevrolet trucks, all painted yellow, with black lettering. He keeps the trucks clean, repaints them often. It's common practice, when he has a large order to deliver, to send his fleet of trucks 3 or 4 mi. out of the way to enable them to traverse the main streets of four or five towns that wouldn't ordinarily see the shipment.

He makes it an object for each of his truck drivers to report on sales opportunities. If a driver sees a field under water, he's more than likely to drive up into the barn yard and talk to the farmer about drainage. Later he reports the call and the salesman follows it up. Pete makes drain tile, 5-in. to 12-in., on a Ziegler machine and 14-in. and upwards on a Quinn. Last season he sold over 300,000 tiles as a result of tips turned in by his own truck drivers. And they're good tiles. When he furnished 11,000 5-in. tiles for underdrainage at the Spencer sewage-disposal plant, the engineers made cylinder tests of the concrete on a testing machine with a 200,000-lb. limit. The 6-in. by 12-in. standard cylinder showed no signs of failure when the machine reached its limit of pressure.

So there again you have it: a first-class product, plus common-sense selling. Pete doesn't know any other formula, except that he does aim to have the goods on hand when needed.

In 1935 he built the Spencer "House of To-morrow", which was open to visitors for two months and was inspected by 31,000 people. Pete is now living in it. It is absolutely fireproof, air-conditioned, made entirely of concrete masonry and precast joist floors and roof. The demonstration of this house did a lot to publicize the value of concrete residence construction. Incidentally it didn't hurt Pete's products business.

A power stripper is the main production machine for concrete block.

An excellent example of the use of Macstone, a lightweight concrete unit faced with natural Briar Hill sandstone, on the Wunderlich Mortuary at Joliet, Ill. Those in this building were supplied by the Instone Co., Hammond, Ind. From the description of the Instone plant in the July, 1938, issue, readers may have inferred that this company is the originator and licensee of the process. This is not the case. All rights are controlled by the Macstone Division of the R & L Machinery Co., Kendallville, Ind., the Instone Co. being but one of the licensees, others operating at Milwaukee and Detroit. At Elkhart, Ind., the firm of Truex & Linton has just been licensed and had equipment furnished by the R & L concern and operations are expected to get under way shortly. Macstone has been hailed by architects as a boon to builders of the modern home or stately cathedral, since it possesses the beauty of natural stone and provides the strength and insulation of lightweight concrete at remarkably low cost.

DENVER LIKES CUSTOM-MADE CONCRETE

A view of the new plant of the Ready Mixed Concrete Co. of Denver which illustrates the gravity flow of aggregates through the plant. Cement is unloaded from cars in background.

By W. E. TRAUFFER

IT has been very interesting to the writer to notice, over a period of years, the problems encountered in various cities by those pioneering in the production of ready-mixed concrete. In the early days of the industry producers met much stubborn resistance to their product and in many cases had to push through an alteration of the local building code before they could get this material accepted. This resistance is even to-day encountered by a producer pioneering the production of ready-mixed concrete in virgin territory, although seldom to as great a degree. Custom and tradition must be overcome and contractors usually prefer to keep concrete mixing a part of their own work until their own job mixers wear out or they are convinced that it is to their advantage to buy concrete.

It is, therefore, refreshing to find a producer in a territory which eagerly accepted ready-mixed concrete and uses it in every class of construction including city, county, state, Federal and private building. The Ready Mixed Concrete Co., Denver, Col., is the company referred to and it is not astonishing that the progressive city of Denver quickly accepted this modern building material. Among the large projects which have been supplied with concrete by this company are: the Railway Exchange Bldg. (a modern 7-story office building), the 8-story Albany Hotel, the 46th Ave. Subway, the 9-story State of Colorado office building, a 5-story crude rubber warehouse for the Gates Rubber Co., the city sewage-disposal plant, state testing laboratory, many highway bridges and structures, and many other new private buildings and alterations.

Late in 1936 Frank P. Spratlen, Jr., and Lloyd S. Brannan, president and vice-president, respectively, of the J. W. Brannan Sand & Gravel Co., formed the Ready Mixed Concrete Co. as a partnership. A plant was built at 53rd and Clarkson Sts. from which location it was possible to supply concrete economically to several large outlying projects without neglecting general demand nearer the center of the city. When these projects were completed it was decided to remove the plant to a site at 3200 Brighton Blvd. within a mile of

One of the truck-mixers discharging concrete to a large construction job near Denver.

Another view showing how concrete was poured on a job in the city.

the main industrial and business sections. In rebuilding the plant it was also enlarged and improved so that it now represents the latest in plant design. Operations were resumed at the new location early in September, 1937, to meet urgent demands for concrete, although the plant was not completed until a month or more later.

The plant was built at the side of a railroad siding which is on a fill. This makes only a short elevator necessary to load the bulk cement into bins. An earth fill terminating in a steel-girder ramp was built so that aggregates can be discharged from trucks direct into the bins. The space under and adjoining this ramp has been inclosed and is used for the storage of sacked high-early-strength and special cements. There is space for three carloads of cement. Reinforced-concrete retaining walls support the plant structure and ramps. The truck-mixers are backed into a concrete-walled depression for loading. The completed plant is compact, yet ample provision has been made for future expansion. It is built entirely of steel and has been painted aluminum color. Further to improve appearances the driveways will be paved with concrete and the entire 5-acre property will be landscaped. As the plant is located on one of the heavily-traveled main highways this will be good advertising for its product. The plant was designed by Donald J. Milligan, engineer for the company, who also supervised its construction.

Bulk cement is unloaded from boxcars by a Link-Belt power scraper. This discharges the cement into a hopper from which it is fed by a Link-Belt screw-conveyor to the 22-ft. Link-Belt bucket-elevator serving the 350-bbl. Blaw-Knox cement-storage bin. A 600-bbl. circular cement bin was installed after the plant went into operation and is served by a similar scraper and screw-conveyor. A vertical screw is used to elevate the cement into this bin. Each of these bins has a Bindicator for indicating when it is full. The unloaders and hoppers have been completely inclosed so that cement can be unloaded in any kind of weather.

Aggregates are stored in a Blaw-Knox steel bin with 3 compartments of 25 cu. yd. capacity each. Usually 1½-in. and 1¼-in. gravel and sand are stored. Each of these compartments has been covered with a counter-weighted door which prevents weather conditions from affecting the moisture content.

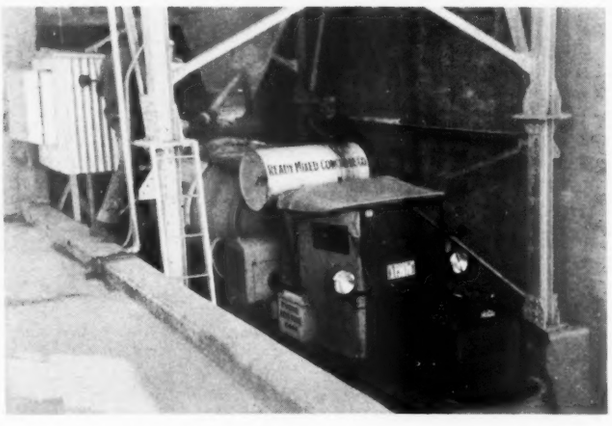
Lever-operated gates discharge the aggregates into a 2-cu. yd. Blaw-Knox weighing batcher which is equipped with a 3-beam Winslow scale and an indicator.

Cement is discharged from the 350-bbl. bin into a Blaw-Knox 3-bbl. weighing batcher which is equipped with a 2-beam Winslow scale and an indicator. Cement is fed from the 600-bbl. bin to a screw-conveyor with a Link-Belt butterfly gate at its discharge end, which supplies the same batcher. Opening and closing this gate actuates a switch which starts and stops the screw-conveyor. Compressed air is used to keep the cement from arching in the bins. The sacked cements are fed to the batcher by means of hand trucks and gravity chutes. Each batcher has an inspection hole so the operator can see if it is thoroughly cleaned out.

Water is obtained from a well near the plant and is pumped into a 500-gal. tank on the batching floor. An automatic float-controlled switch in this tank controls the pump. Water is measured into the truck-mixers by a Bowser "Xacto" meter. The water is discharged into the mixers at the same time as the material, thereby insuring adequate mixing on short hauls.

The company operates four Chain-Belt Rex truck-mixers mounted on 5-ton White truck chassis. One of these is a 4-cu. yd. mixer and the others are 3-cu.

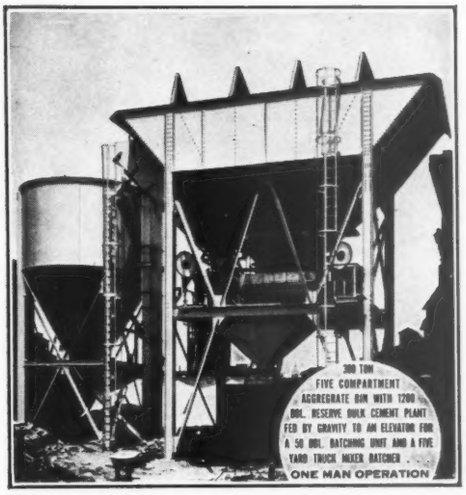
The aggregate storage bins with the counter-weighted doors open.



Truck-mixers being loaded. The water meter is inclosed at left.

HELTZEL BIN EQUIPMENT . . .

Whenever or wherever storage, batching or bulk cement plants are needed Heltzel-built equipment has always been the leader in point of service, ease of installation, economy of operation and length of service. Portable bins, built to suit the requirements of the concern whose base of operations change from place to place, are the only PORTABLE bins on the market.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FIVE COMPARTMENT
AGGREGATE BIN WITH 1200
BBL. RESERVE BULK CEMENT PLANT
FED BY GRAVITY TO AN ELEVATOR FOR
A 50 BBL. BATCHING UNIT AND A FIVE
YARD TRUCK MIXER BATCHER
ONE MAN OPERATION

Standard Circular, Square and Oblong bins, ranging in capacity from 35 to 500 tons, available in one, two, three and four compartments, featuring convertibility from one to two or three or four compartments without making alterations or changes in weighing or batcher equipment, make specially built or designed equipment almost unnecessary.

Bulletins S-18-B and S-21-B, describing in detail these plants and their varied applications, are ready. Write today for your copies.

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- BINS, Portable and Stationary
- CEMENT BINS, Portable and Stationary
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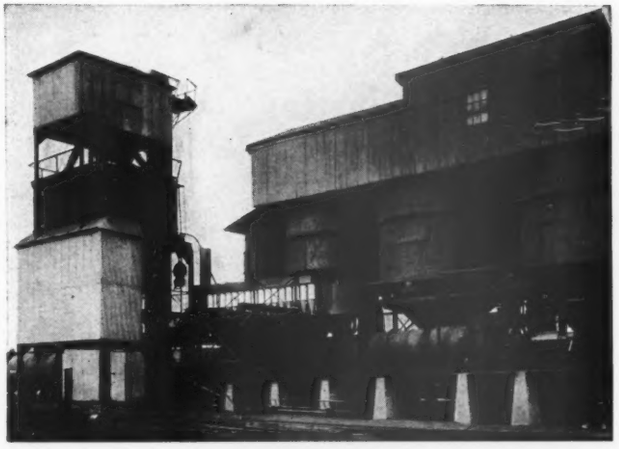
HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO, U.S.A.



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CAPACITY, DESIGN AND ARRANGEMENT
TO MEET
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Designed and Built
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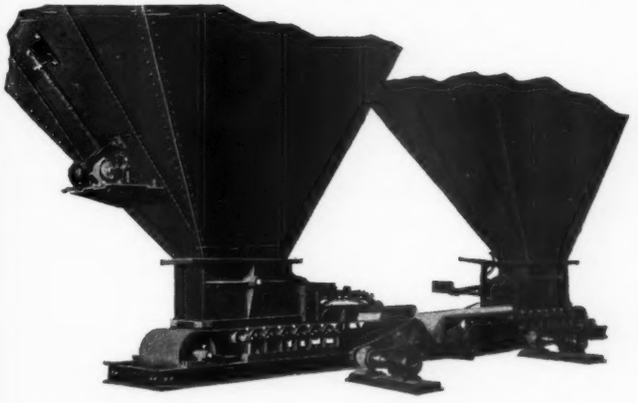

The proportioning of the raw materials—sand, cinders, gravel, etc., with the binders—lime, cement, etc., to make a perfect product is very important from the standpoint of the physical proportions of the brick, block, etc., and from economical operation. The Volumeter, as shown, is used in connection with the Rod Mill, insuring a perfect mix with a low cost of operation and perfection. Write for further information.

JACKSON & CHURCH CO.
Sand-Lime Brick Machinery
Saginaw, Mich.

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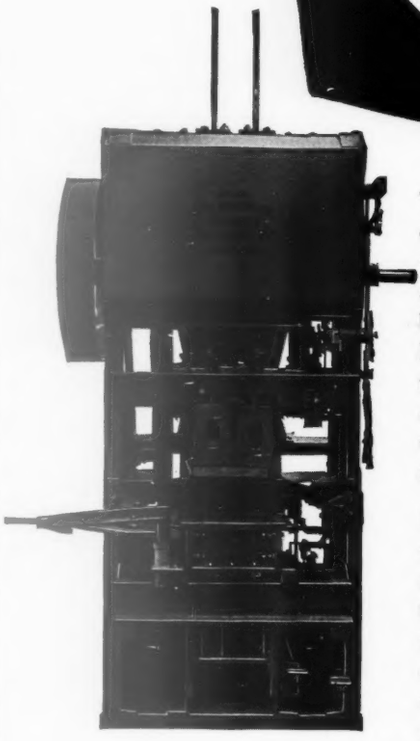


To make big money in the concrete block business, you must be able to meet all demands quickly and economically for any size blocks and any quantity of blocks. Here is the machine that does all this and more—a sturdy, modern, compact unit capable of making 5 to 6 blocks per minute in 4″, 6″, 8″, 10″ and 12″ dimensions.

It is semi-automatic with time-control clutch lever, governing the complete operation of filling and tamping. Produces quality blocks, true to size and finished alike on every side—easy to lay—and insuring distinctive texture and uniformity.

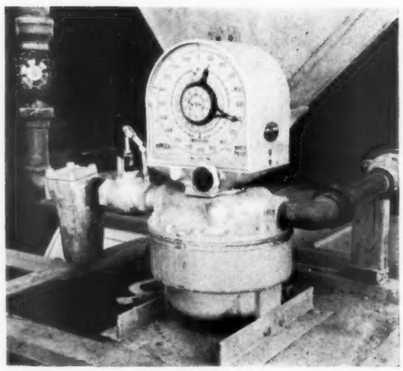
MULTIPLEX builds every type and size of machine you need for concrete block making *at a profit*. They are in hand or power operated models, with capacities ranging from 400 to 3000 units per day.

Be sure to ask about the new Multi-Mixer that operates with reverse screw paddle action, assuring faster and more uniform mix.

Write for Your Copy

The Multiplex CONCRETE MACHINERY COMPANY

ELMORE, OHIO



The automatic water meter used in this plant.

yd. mixers. All are driven by Hercules auxiliary gasoline engines.

Cement and aggregates are discharged through lever-operated gates from the batchers into collector chutes. These feed through an adjustable spout into the mixers. Each mixer has a water tank, but these tanks are used only for water to wash out the mixers on the return trip to the plant.

Each night the mixers are washed out thoroughly at the company's main yard with Kerrick Kleaner made by the Clayton Mfg. Co. A mixture of live steam, cleaner and water under pressure is sprayed from a hose on the inside and outside of the drum to remove dirt and hardening concrete or cement. The company believes that a neat and clean truck is one of the best advertisements for its product.

The water in the storage tank is heated for cold-weather operation by steam from a 73-hp. Kewanee low-pressure boiler of the three-pass type. Coal is fed to this boiler from a 9-ton bin by a 350-lb. per hr. Fairbanks-Morse stoker. Water is maintained at any desired temperature by an aquastat control. Provision is made for the use of steam in the rock-storage bins, if this should ever be necessary.

Concrete has been delivered from this plant over distances up to 37 mi. As much as 350 cu. yd. has been produced in a 7-hr. day, using only four trucks. With the addition of a few more trucks it is believed that 600 cu. yd. could be produced and delivered. A small laboratory at the plant is used for testing all the materials used and for checking the quality of the concrete. Operations are carried on through most of the winter, as Denver usually has only a few months of really cold weather.

The company recently supplemented this stationary operation with a semi-portable batching plant which can be located near large construction projects in and near Denver. This plant consists of a 51-ton Blaw-Knox 2-compartment bin, bucket-elevator, scale-batcher bin and portable cement warehouse.

The Popular Choice ★ BLAW-KNOX TRUKMIXERS and Agitators

★ Preferred by contractors, engineers, and users *because:*

. . . they mix concrete faster and more thoroughly.

. . . they produce high strength concrete of maximum workability.

. . . the exclusive Blaw-Knox Water Measuring System is accurate and dependable.

. . . Blaw-Knox Trukmixers are free from breakdowns and delays, insuring continuous dependable service.

. . . they have greater durability due to the use of high quality materials and superiority of design.

. . . ease and speed of operation mean more trips and greater profits.

The desirable and popular features of Blaw-Knox Trukmixers and Agitators are completely illustrated and described in the new Blaw-Knox Catalog No. 1582. *Send for your copy.*

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The Reason— Users Compare the Details and Then Buy

What Helps Business Helps You!

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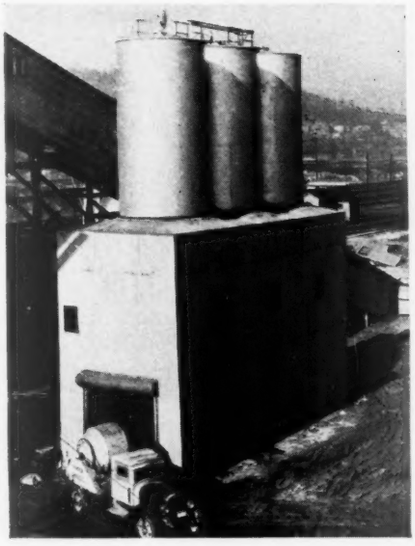

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Brooks-Taylor Lime Putty Plant

The Richter Concrete Corporation delivered 3,500 cu. ft. of aged lime putty brick mortar—sometimes as high as 50 cu. yds. per day—for one job from the plant illustrated above. You too can increase your deliveries by supplying your customers with a ready-mixed mortar service and aged lime putty for plaster. Write for information.

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Houston.....2919 Main Street
Tulsa.....1648 Hunt Bldg
Birmingham.....1503 North Fiftieth St
Dallas.....1486 Liberty Bank Bldg.
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Los Angeles.....1457 Wm. Fox Bldg.

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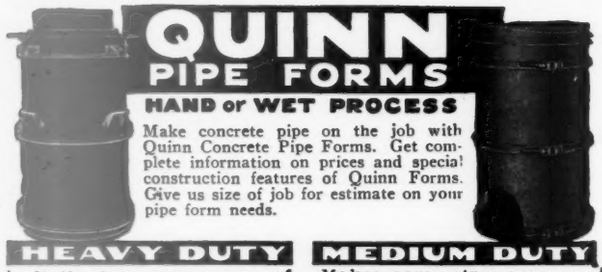

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HAND or WET PROCESS

Make concrete pipe on the job with Quinn Concrete Pipe Forms. Get complete information on prices and special construction features of Quinn Forms. Give us size of job for estimate on your pipe form needs.

HEAVY DUTY

Built for more years of service—sizes for any diameter pipe from 12 to 84 inches—any length—tongue and groove or bell end.

MEDIUM DUTY

Makes same sizes pipe as "Heavy Duty" but built to meet demand for lower cost equipment to produce uniform quality in smaller amounts.

Also manufacturers of concrete pipe machines for making pipe by machine process.

QUINN WIRE & IRON WORKS 1627 12 St. Boone, Iowa

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One of the 16
ALBERT PICK HOTELS

HOTEL MARK TWAIN

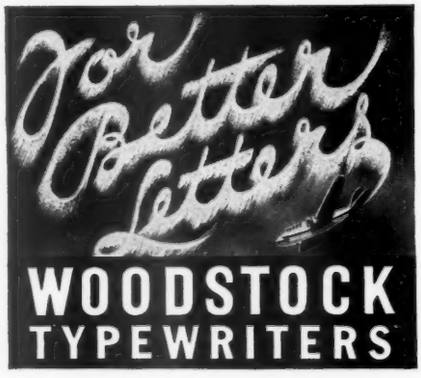
ST. LOUIS' NEW LOW RATE **$2 UP** TILE BATH TUB & SHOWER ICE WATER

- NEWEST DOWNTOWN HOTEL
- 4 FOOD-FAMOUS RESTAURANTS
- LOWEST GOOD FOOD PRICES

T. V. LORAN, Mgr.

ST. LOUIS

It's NEW!
If you're looking for the fastest, most modern and most practical truckmixer on the market, be sure to investigate SMITH-MOBILE. Write for new bulletin.
The T. L. SMITH CO.
2887 N. 32nd St.
Milwaukee, Wis.
NO HOIST required to get high discharge.
Smith-Mobile
TRUCKMIXER AND AGITATOR



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JAEGER again steps ahead with the most important truck mixer improvement in 8 years . . .

1. SYPHO-METER WATER TANK

accurate within a fractional percent of tank capacity *regardless of tank position or splashing on rough roads.* Valve can even be left open on long hauls with perfect safety.

2. DUAL REVOLVING WATER SPRAYS

Giving 100% Faster, Uniform Water Distribution — Clear Path as They Revolve, Spray Into and Over Mass in both directions, from end to end of drum!

3.

Combine with Jaeger Reversing, End-to-End Mixing Action to Insure a Higher Strength, More Uniform. More Workable and

MORE SALABLE CONCRETE

Even on the Shortest Hauls.

END - TO - END REMIXING with 100% FASTER and UNIFORM DISTRIBUTION OF WATER—the 1939 METHOD

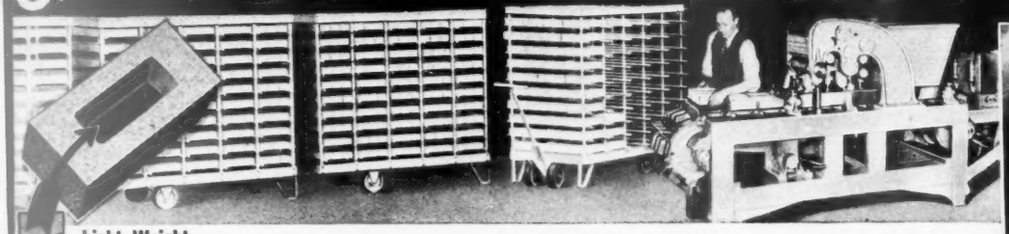
Jaeger 1939 Model Truck Mixers are ready--ready with fundamental advances in truck mixer design --ready to produce the highest quality transit-mixed concrete ever offered to contractors, architects and engineers--ready to win customers and profits for Jaeger operators in one of the most actively expanding industries in America today.

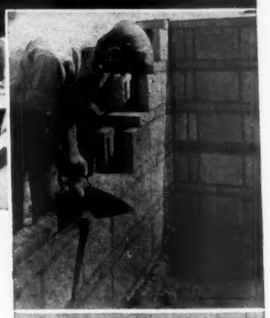
Our new bulletin "ADVANCE INFORMATION ON JAEGER 1939 MODEL TRUCK MIXERS" gives full details. Send for your copy--today.

THE JAEGER MACHINE CO.

602 Dublin Avenue — Columbus, Ohio

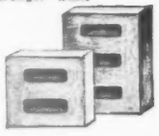
TODAYS GREATEST MANUFACTURING OPPORTUNITY-----





Light Weight Big Savings

An improved design brick that saves 20% in weight and material in either faced or common. Reduces trucking costs, handles easier, lays faster and builds a stronger wall.



Double and triple brick sizes further reduces costs. Permit hollow wall, fireproof masonry construction at cost level of frame.

OPPORTUNITY COMPLETE, READY-MADE FOR YOU IN YOUR LOCALITY—One that is proven—ready for you to cash in on the great building up-turn under way. It includes the essentials upon which sound and successful business enterprises are established.

SUPERIOR PRODUCT, LOW COST PRODUCTION—You will produce a material using 90% aggregate—A product in full range color or texture and capable of meeting all known building requirements—One accepted by Government and City Building Departments—Made by line-production machines.

EARNING POWER AND FUTURE—Present DUNBRIK-DUNSTONE Manufacturers already point the way for you. Some are selling output at 100% over cost. Others are getting as high as 80% of the brick business.

WE EQUIP YOU WITH LINE PRODUCTION MACHINERY—Large Production—only one or two men. Equipment costs but fraction of other processes of equal capacity. Franchise granted covering your locality—protecting your market, business and future.

SEND FOR BOOK—"4 Keys to Success." It tells the complete story—How present manufacturers are making outstanding progress in this new industry—One that offers unlimited opportunity for growth, expansion and profit. Write today.

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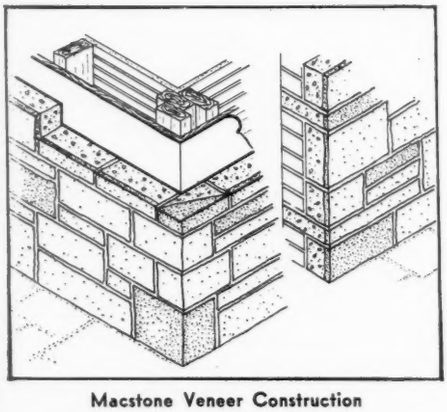
"THE PREFERRED BUILDING MATERIAL"



Macstone Veneer Construction

A natural stone faced lightweight, insulated concrete unit developed and patented for use wherever random or other ashlar stone masonry walls are desired.

A great charm and beauty of stone masonry is obtained in the highest degree with this product which gives all the outward effect of solid stone construction, but with physical properties in the product not possessed by the solid stone itself, in that the concrete backing has a high degree of insulated value and fire resistance, minimized capillary action, with a pronounced resistance to water penetration, and a reduction of one-third and more in the total weight of the mass.

MACSTONE will put the Concrete Products industry at the head of the parade. Join the ranks now and secure a franchise to produce this outstanding building material exclusively in your territory. No price cutting competition to deal with.

FOR FURTHER DETAILS ON MANUFACTURING RIGHTS AND EQUIPMENT FOR PRODUCING MACSTONE

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Kendallville, Ind.

Home faced with Macstone, Plainfield, Ill.

for Joining and Repairing

CONVEYOR BELTS

FLEXCO HD

BELT FASTENERS — **RIP PLATES**

U. S. Pat. 1,382,799

FLEXCO HD BELT FASTENERS make a tight butt joint of great strength and long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Five sizes in steel and alloys.

FLEXCO HD RIP PLATES are used in repairing rips and patching conveyor belts. The added width gives a desirable long grip on the edges of the rip. Consultation on belt joining and repair invited. Sold through jobbers and belting houses the world over.

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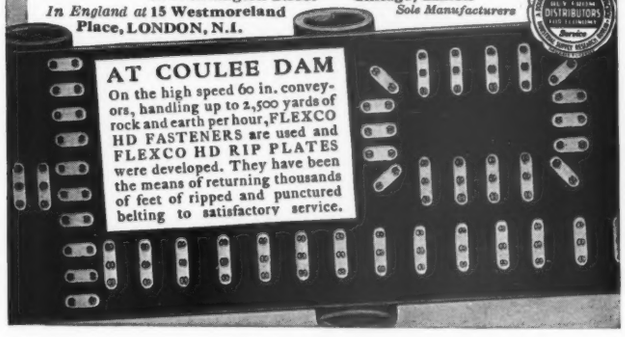
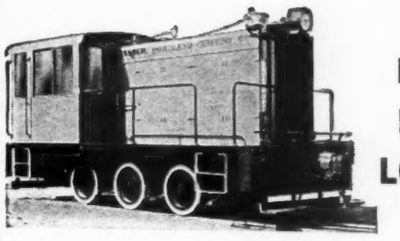
In England at 15 Westmoreland Place, LONDON, N.1. *Sole Manufacturers*



AT COULEE DAM
On the high speed 60 in. conveyors, handling up to 2,500 yards of rock and earth per hour, FLEXCO HD FASTENERS are used and FLEXCO HD RIP PLATES were developed. They have been the means of returning thousands of feet of ripped and punctured belting to satisfactory service.

HAUL AT LOWEST COSTS



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Because Davenport Industrial Locomotives embody the best of modern locomotive practices, they insure easier and faster haulage with complete dependability. That means lower costs and increased profits throughout an exceptionally long service life.

There is a size and type of Davenport exactly suited to your needs—2½ to 100 tons. Meet your haulage problems the Davenport way. Our engineers will gladly analyze your requirements and submit dependable recommendations without the slightest obligation. DAVENPORT LOCOMOTIVE WORKS, Davenport, Iowa.

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The wise traveler knows that the most he can get for his money is a good night's rest in a friendly, pleasant atmosphere. In Pittsburgh he stops at the Henry, where he can practice prudent economy and yet enjoy the utmost in genuine comfort.

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$2.50 WITH BATH

FRANK PARKE, *Genl. Mgr*

FIFTH AVENUE AT SMITHFIELD

PITTSBURGH

Sauerman Slackline dumping into hopper.

Hill excavation with Sauerman Drag Scraper.

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LONG RANGE MACHINES

The first cost of a Sauerman Slackline or Drag Scraper machine for the average long haul job is less than the cost of any other equipment that will dig, haul and place an equal yardage of materials. Moreover, a Sauerman machine is easy to operate and demands little by way of repairs, assuring a minimum daily expense.

Whether your problem is to dig gravel from a deep pit, high bank or river, or to convey loose rock from quarry to crusher, or to stockpile and reclaim surplus products—there is a type and size of Sauerman machine to meet your needs.

Write for our catalog or tell us about your problem and our engineers will give you their suggestions.

SAUERMAN BROS.
434 S. Clinton St., CHICAGO

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Index to Advertisers on Page 114

Aggregate-Bituminizing Plants
Hetherington & Berner, Inc.
*Warren Brothers Roads Co.

Agitators, Thickeners and Slurry Mixers
*Hardinge Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Air Compressors (Portable)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Air Compressors (Stationary)
*Chicago Pneumatic Tool Co.
Fuller Company
*Ingersoll-Rand Co.

Air Conditioning
Jackson & Church Co.

Air Filters
*Blaw-Knox Co.
*Dracco Corp.
*Parsons Engineering Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Air Pumps
*Ingersoll-Rand Co.

Air Separators
Babcock & Wilcox Co.
Bradley Pulverizer Co.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Sly Mfg. Co., W. W.
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*Williams Patent Crusher & Pulverizer Co.

Alloys (Steel)
Chicago Steel Fdry. Co.
Frog, Switch & Mfg. Co.
Manganese Steel Forge Co.
Stulz-Sickles Co.

Ash and Refuse Handling Equipment
Allen-Sherman-Hoff Co.
*Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

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*Warren Brothers Roads Co.

Automatic Feeders
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*Fuller Company
*Hardinge Co.
Jackson & Church Co.
*Link-Belt Co.
Schaffer Poidometer Co.

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*Fuller Company
*Jaeger Machine Co.
*Merrick Scale Mfg. Co.
Schaffer Poidometer Co.

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*Insley Mfg. Corp.

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*Bucyrus-Erie Co.
*Lima Locomotive Works
Northwest Engr. Co.

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Babcock & Wilcox Co.
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*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Manganese Steel Forge Co.
*Traylor Engr. & Mfg. Co.

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*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Manganese Steel Forge Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

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*Chicago Bridge & Iron Co.

Bar Mills
Jackson & Church Co.

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Robins Conveying Belt Co.
*Sprout, Waldron & Co.
Timken Roller Bearing Co.

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Timken Roller Bearing Co.

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Armstrong-Bray & Company
Flexible Steel Lacing Co.

Belt Lacings
Armstrong-Bray & Company
Flexible Steel Lacing Co.

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*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Quaker City Rubber Co.
Republic Rubber Co.
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Republic Rubber Co.

Belts (Fan)
Quaker City Rubber Co.
Republic Rubber Co.

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Allen-Sherman-Hoff Co.
*Fuller Company
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*Hendrick Mfg. Co.
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McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

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Bins (Steel)
*Austin-Western Road Machy. Co.
*Chicago Bridge & Iron Co.
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*Hendrick Mfg. Co.
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*Universal Crusher Co.

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Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
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*Ensign-Bickford Co.

Block Machines (Concrete)
Dunn Mfg. Co., W. E.
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Stearns Mfg. Co.

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R & L Concrete Machinery Co.
Stearns Mfg. Co.

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*Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
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*Sly Mfg. Co., W. W.

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Jaeger Machine Co.
Smith Co., T. L.

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Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

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R & L Concrete Machinery Co.
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Stearns Mfg. Co.

Bronze Work (Ornamental)
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*Tyler Co., W. S.

Bucket Elevators (See Conveyors and Elevators)

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*Blaw-Knox Co.
*Haiss Mfg. Co., Geo.
*Insley Mfg. Corp.
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Wellman Engineering Co.

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*Bucyrus-Erie Co.
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Wellman Engineering Co.

Buckets (Dump)
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*Insley Mfg. Corp.
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Buckets (Elevator and Conveyor)
Chicago Steel Fdry. Co.
Haiss Mfg. Co., Geo.
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McLanahan and Stone Corp.
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Wall Rope Works, Inc.

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Leschen & Sons Rope Co., A.
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Capstans (See Winches and Capstans)

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Jackson & Church Co.
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*Robins Conveying Belt Co.
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*Austin-Western Road Machy Co.
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Cars (Block, Concrete)
Multiplex Concrete Machinery Co.

Cars (Brick Hardening—Metal)
Jackson & Church Co.

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*Buchanan Co., C. G.
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Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.
*Sprout, Waldron & Co.

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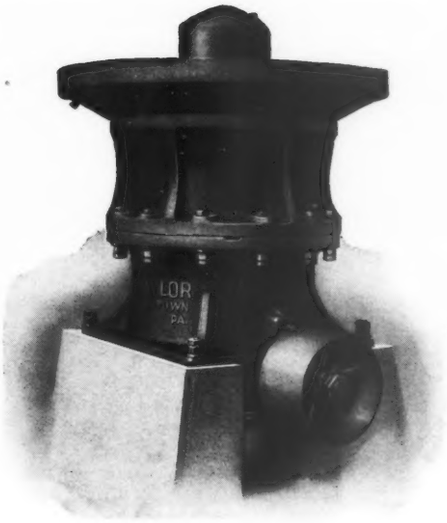
* See also information in the 1938 Pit and Quarry HANDBOOK.



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Today, we say, unequivocally, it is unrivalled in simplicity, economy and efficiency. We've plenty of proof to back this statement. Write us today what your problem is, or at least send for our new Bulletin 2112.

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It's amazing how easily you can install one of these filters. They are designed for suspending from overhead structures, or for setting on the plant floors. If desired, the filter may be installed outside of the plant on a small concrete foundation. After the filter is installed, wire up the exhaust fan motor, connect the dust pipe to the filter case and the equipment is ready for operation. ★

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And the cost of a Sly Unit Filter is very reasonable—averaging only about $500 per installation to suppress dust at two or three points. At this low figure a filter easily pays its way—by the savings and protection it effects. Ask for Bulletin 93—it will give you facts all stone plant operators should know.

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DOLLARS IN DUST

Cottrell Precipitator

● **Two things are certain about all industrial dusts: they either cost money for belts, bearings, property damage and employee morale, or they lose money by the escape of valuable prime or by-product material—or both.**

● **Hour after hour—mounting into years—the losses and hazards add up far beyond the cost of equipment to stop them.**

● **No dust condition—big or little—is beyond correction with a Western Precipitation Corporation installation. The design will exactly fit your condition. Any volume can be handled, at any temperature, wet or dry, acid or alkaline, coarse or fine, down to fog, fume or mist.**

● **If desired, you may have a guaranty to any efficiency, based on the ratio between total solids collected to total solids entering the collector.**

Send for Bulletins

WESTERN PRECIPITATION CORPORATION

1016 West 9th St., Los Angeles, California • New York, N. Y.
Precipitation Co. of Canada, Ltd., Dominion Sq. Bldg., Montreal

COTTRELL PRECIPITATORS . . . MULTICLONES . . . SPRAY DRYERS

PIONEER IN DUST AND FUME CONTROL

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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***Haiss Mfg. Co., Geo.**
***Hendrick Mfg. Co.**
***Jeffrey Mfg. Co.**
***Kennedy-Van Saun Mfg. and Eng. Co.**
Lewistown Foundry & Machine Co.
***Link-Belt Co.**
McLanahan & Stone Corp.
New Holland Machine Co
***Robins Conveying Belt Co.**
Smith Engr. Works
***Sprout, Waldron & Co.**
Sturtevant Mill Co.
***Universal Crusher Co.**

Conveyors (Pneumatic)
***Dracco Corp.**
***Fuller Company**

Conveyors (Ready-Mixed Concrete)
***Blaw-Knox Co.**
***Haiss Mfg. Co., Geo.**
***Jaeger Machine Co.**
***Link-Belt Co.**
***Robins Conveying Belt Co.**

Coolers (Clinker)
***Fuller Co.**
***Smidth & Co., F. L.**
***Traylor Engr. & Mfg. Co.**

Coolers (See Kilns and Coolers—Rotary)

Correcting Basins
***Smidth & Co., F. L.**

Couplings (Flexible and Shaft)
Erie Pump & Engine Works
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***Robins Conveying Belt Co.**
***Sprout, Waldron & Co.**

Couplings (Hose)
***Chicago Pneumatic Tool Co.**
***Ingersoll-Rand Co.**

Cranes (Crawler and Locomotive)
***Austin-Western Road Machy. Co.**
***Bay City Shovels, Inc.**
***Bucyrus-Erie Co.**
***Insley Mfg. Corp.**
***Lima Locomotive Works**
***Link-Belt Co.**
Northwest Engr. Co.

Crusher Parts
***American Pulverizer Co.**
***Birdsboro Steel Fdry. & Machine Co.**
***Buchanan Co., C. G.**
Frog, Switch & Mfg. Co.
***Kennedy-Van Saun Mfg. and Eng. Corp.**
McLanahan and Stone Corp.
***Traylor Engr. & Mfg. Co.**
***Universal Crusher Co.**

Crushers (Cone)
***Nordberg Mfg. Co.**

Crushers (Hammer)
***American Pulverizer Co.**
***Austin-Western Road Machy. Co.**
***Birdsboro Steel Fdry. & Machine Co.**
Bradley Pulverizer Co.
***Brooks Equip. & Mfg. Co.**
***Buchanan Co., C. G.**
Carnegie-Illinois Steel Co.
***Dixie Machy. Mfg. Co.**
***Gruendler Crusher & Pulverizer Co.**
***Kennedy-Van Saun Mfg. and Eng. Corp.**
Sturtevant Mill Co.
***Universal Crusher Co.**
***Williams Patent Crusher & Pulverizer Co.**

Crushers (Jaw and Gyratory)
***Austin-Western Road Machy. Co.**
Bacon, Inc., Earle C.
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Brooks Equip. & Mfg. Co.
***Buchanan Co., C. G.**
***Gruendler Crusher & Pulverizer Co.**
***Kennedy-Van Saun Mfg. and Eng. Corp.**
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New Holland Machine Co.
***Nordberg Mfg. Co.**
Smith Engr. Works
***Traylor Engr. & Mfg. Co.**
***Universal Crusher Co.**

Crushers (Ring)
***American Pulverizer Co.**
***Williams Patent Crusher & Pulverizer Co.**

Crushers (Roll)
***American Pulverizer Co.**
***Austin-Western Road Machy. Co.**
***Birdsboro Steel Fdry. & Machine Co.**
***Brooks Equip. & Mfg. Co.**
***Buchanan Co., C. G.**
***Gruendler Crusher & Pulverizer Co.**
***Jeffrey Mfg. Co.**
***Kennedy-Van Saun Mfg. and Eng. Corp.**
***Link-Belt Co.**
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New Holland Machine Co.
***Robins Conveying Belt Co.**
***Universal Crusher Co.**
***Williams Patent Crusher & Pulverizer Co.**

Crushers (Rotary)
***American Pulverizer Co.**
***Austin-Western Road Machy. Co.**
Jackson & Church Co.
New Holland Machine Co.
***Williams Patent Crusher & Pulverizer Co.**

Crushing Rolls
***Austin-Western Road Machy. Co.**
Babcock & Wilcox Co.
***Birdsboro Steel Fdry. & Machine Co.**
***Buchanan Co., C. G.**
***Kennedy-Van Saun Mfg. and Eng. Corp.**
***Link-Belt Co.**
McLanahan and Stone Corp.
New Holland Machine Co.
Sturtevant Mill Co.
***Traylor Engr. & Mfg. Co.**
***Williams Patent Crusher & Pulverizer Co.**

Cutter Heads (Dredging)
***Birdsboro Steel Fdry. & Machine Co.**
***Buchanan Co., C. G.**
***Eagle Iron Works**

Derricks
***Insley Mfg. Corp.**

Detonators
Atlas Powder Co.

Diaphragms (Rubber)
Quaker City Rubber Co.

Diesel Engines (See Engines—Diesel)

Dipper Parts
Frog, Switch & Mfg. Co.

Dippers and Teeth (Power Shovel)
***Birdsboro Steel Fdry. & Machine Co.**
***Buchanan Co., C. G.**
***Bucyrus-Erie Co.**
Frog, Switch & Mfg. Co.
***Insley Mfg. Corp.**

Dragline Cableway Excavators
***Bucyrus-Erie Co.**
***Link-Belt Co.**
***Sauerman Bros., Inc.**

Dragline Excavators
***Austin-Western Road Machy. Co.**
***Bay City Shovels, Inc.**
***Bucyrus-Erie Co.**
***Insley Mfg. Corp.**
Jackson & Church Co.
***Lima Locomotive Works**
***Link-Belt Co.**
Northwest Engr. Co.

Draglines (Walking)
***Bucyrus-Monighan Co.**

Dredges
***Birdsboro Steel Fdry. & Machine Co.**
***Buchanan Co., C. G.**
***Bucyrus-Erie Co.**
Hetherington & Berner, Inc.
***Morris Machine Works**

* See also information in the 1938 Pit and Quarry HANDBOOK.

Drills (Blast-Hole)
*Bucyrus-Erie Co.
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Core)
Hoffman Bros. Drilling Co.
*Ingersoll-Rand Co.
Pennsylvania Drilling Co.

Drills (Diamond)
*Chicago Pneumatic Tool Co.
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Drifting)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Hand Hammer)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Rock)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Sinking)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Stoping)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Wagon)
*Bucyrus-Erie Co.
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drills (Water Well)
*Bucyrus-Erie Co.

Drills (Well) (See Drills—Blast-Hole)

Dryers
Babcock Wilcox Co.
*Chicago Bridge & Iron Co.
*Hardinge Co.
Jackson & Church Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Dust Arresters
*Blaw-Knox Co.
*Dracco Corp.
*Parsons Engineering Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Collecting Systems
Allen-Sherman-Hoff Co.
*Blaw-Knox Co.
*Dracco Corp.
*Parsons Engineering Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Conveying Systems
Allen-Sherman-Hoff Co.
*Blaw-Knox Co.
*Dracco Corp.
*Fuller Company
*Parsons Engineering Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Filters
Parsons Engineering Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Dynamite (See Explosives)

Electrodes (Welding)
Stulz-Sickles Co.

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Elevator Buckets (See Buckets—Elevator and Conveyor)

Elevators (See Conveyors and Elevators)

Eliminators (Soft Stone) (See Soft Stone Eliminators)

Engineers
Bacon, Inc., Earle C.
*Birdsboro Steel Fdry. & Machine Co.
Bradley Pulverizer Co.
*Buchanan Co., C. G.
*Fuller Company
Hetherington & Berner, Inc.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
Strong-Scott Mfg. Co.
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.
Wellman Engineering Co.

Engine Generator Sets
See Generator Sets (Engine).

Engines (Diesel)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
*Cooper-Bessemer Corp.
Cummins Engine Co.
*Ingersoll-Rand Co.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Engines (Internal-Combustion)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
*Cooper-Bessemer Corp.
Cummins Engine Co.
*Ingersoll-Rand Co.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Engines (Steam)
*Ingersoll-Rand Co.
*Morris Machine Works
*Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
*Haiss Mfg. Co., Geo.

Explosives
Atlas Powder Co.

Fabricating (Electric Arc and Oxy-Acetylene)
Stulz-Sickles Co.

Fans (Exhaust)
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
Babcock & Wilcox Co.
Bradley Pulverizer Co.
*Fuller Company
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.

Gas Producers
Wellman Engineering Co.

Gaskets
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

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Gates (Clamshell)
*Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
*Link-Belt Co.
*Sprout, Waldron & Co.

Gears and Pinions
*Birdsboro Steel Fdry. & Machine Co.
*Buchanan Co., C. G.
*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Generator Sets (Engine)
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
Superior Diesel Engine Division of the National Supply Co.

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grapples
Owen Bucket Co.

Grating (Steel)
*Blaw-Knox Co.
*Hendrick Mfg. Co.

Grinding Balls (See Balls, Grinding)

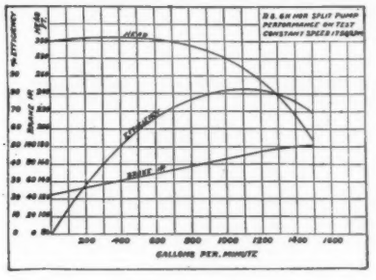
Grizzly Feeders
*Traylor Engr. & Mfg. Co.

Grizzlies
*Eagle Iron Works
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

* See also information in the 1938 Pit and Quarry HANDBOOK.

The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



The "almost-perfect state" . . . .

A few years ago, a well-known columnist (not the editor of The Morris Hydraulic Column) described his conception of a modern Utopia. If he had known about the efficiencies of Morris Centrifugal Pumps, he certainly would have insisted that Morris Pumps be used wherever liquids were to be handled. Morris Pumps are famous for their "almost perfect" conversion of mechanical energy into hydraulic energy. You should know more about these "almost-perfect" pumps. Bulletins on request.

A money-making Morris Microcosm . . . .

There's an interesting community of Morris Dredges at Cleveland, busily engaged in profitable pursuits. Six of them are being used by sand and gravel producers, one is employed in general dredging work, another keeps the water intake clean at a power generating plant, another cuts channels through a marsh land, and another removes silt accumulations from lagoons. Quite a wide variety of occupations, illustrating the versatility of Morris Dredges, and all are making money or saving it for their owners. In every other section of the country, too, Morris Dredges have proved the speediest and most economical equipment for handling under-water material of any kind. Descriptive bulletins on request.

For authoritative recommendations on any pumping or dredging problem, write to Morris Machine Works, Baldwinsville, N. Y. Representatives in principal cities.

BUYERS' GUIDE

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Drill Bit Reconditioning
*Bucyrus-Erie Co.

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*Ingersoll-Rand Co.

Drill Steel
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.

Drilling Accessories
*Bucyrus-Erie Co.
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.
Timken Roller Bearing Co.

Drilling Cables
Wall Rope Works, Inc.

Drilling Contractors
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.
Lewistown Fdry. & Mach. Co.
Manganese Steel Forge Co.
*Robins Conveying Belt Co.
Smith Engr. Works

Guards (Wire)
Manganese Steel Forge Co.
National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

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*Chicago Pneumatic Tool Co.
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
*Insley Mfg. Corp.
Jackson & Church Co.
*Jaeger Machine Co.
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McLanahan and Stone Corp.
*Sauerman Bros., Inc.
Smith Engr. Works
*Sprout, Waldron & Co.

Hoppers
*Chicago Bridge & Iron Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
*Chicago Pneumatic Tool Co.
*Cincinnati Rubber Mfg. Co.
*Ingersoll-Rand Co.
Quaker City Rubber Co.
Republic Rubber Co.

Hose (Fire and Suction)
Quaker City Rubber Co.

Hose Couplings (See Couplings)

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Quaker City Rubber Co.
Republic Rubber Co.

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Idlers
*Barber-Greene Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Indicators (Material Level)
*Fuller Company

Joist and Slab Machines (Concrete)
R & L Concrete Machinery Co.

Kilns and Coolers (Rotary)
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Kilns (Vertical)
*Chicago Bridge & Iron Co.
*Hardinge Co.

Kominuters
*Smidth & Co., F. L.

Ladders (Agitating Dredge)
*Eagle Iron Works

Ladders (Hydraulic Dredge)
*Eagle Iron Works

Lime and Hydrating Plants
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime-Handling Equipment
*Chicago Bridge & Iron Co.
*Fuller Company
*Hardinge Co.
Jackson & Church Co.
Lime & Hydrate Plants Co.
*Link-Belt Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Robins Conveying Belt Co.
*Traylor Engr. & Mfg. Co.

Lime Kilns
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

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*Chicago Bridge & Iron Co.

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*Barber-Greene Co.
*Bucyrus-Erie Co.
*Fuller Company
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Locomotives (Diesel)
Davenport Locomotive Works

Locomotives (Diesel-Electric)
Davenport Locomotive Works

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Davenport Locomotive Works
*Lima Locomotive Works

Locomotives (Gas-Electric)
Davenport Locomotive Works

Locomotives (Oil-Electric)
Davenport Locomotive Works

Locomotives (Storage Battery)
Davenport Locomotive Co.

Locomotives (Trolley)
Davenport Locomotive Co.

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Frog, Switch & Mfg. Co.
Manganese Steel Forge Co.

Manganese Steel (Plates and Sheets)
Frog, Switch & Mfg. Co.
Manganese Steel Forge Co.

Magnetic Separators
*Birdsboro Steel Fdry. & Machine Co.
*Buchanan Co., C. G.

Mechanical Rubber Goods
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.

Mill Liners and Linings
Babcock & Wilcox Co.
Carnegie-Illinois Steel Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Mills (Ball, Tube, etc.)
*Traylor Engr. & Mfg. Co.

Mills (Grinding) (See also Crushers—Hammer)
*American Pulverizer Co.
Babcock & Wilcox Co.
*Birdsboro Steel Fdry. & Machine Co.
Bradley Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Buchanan Co., C. G.
*Hardinge Co.
Jackson & Church Co.
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*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
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*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

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Stearns Mfg. Co.

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R & L Concrete Machinery Co.
Stearns Mfg. Co.

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*Tyler Co., W. S.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

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*Deister Concentrator Co.

Packings
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.

"Paintgrip"
American Rolling Mill Co.

Pallets
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Pans (Wet and Dry)
Jackson & Church Co.

Partitions (Wire)
National Wire Cloth Co

Paving Mixers
*Jaeger Machine Co.

Perforated Metal Plates
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Sprout, Waldron & Co.

Pipe, Dredge (Floating and Shore)
American Rolling Mill Co.
*Chicago Bridge & Iron Co.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Flanges
American Rolling Mill Co.
Hetherington & Berner, Inc.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Fittings
American Rolling Mill Co.
Hetherington & Berner, Inc.

Pipe Forms (Concrete)
Concrete Pipe Machy. Co.
Quinn Wire & Iron Works
R & L Concrete Machinery Co.

Pipe Machines (Concrete)
Concrete Pipe Machy. Co.
Quinn Wire & Iron Works
R & L Concrete Machinery Co.

Pipe (Spiral)
American Rolling Mill Co.
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Pipe (Water, Gas, Low Pressure Steam)
American Rolling Mill Co.
Hetherington & Berner, Inc.

Pipe (Welded)
American Rolling Mill Co.
*Chicago Bridge & Iron Co.
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Plants (Aggremeter) (See Aggremeter Plants)

Plug Valves (See Valves)

Pneumatic Conveying Systems (See Conveyors—Pneumatic)

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Poidometers
Schaffer Poidometer Co.

Portable Conveyors
*Barber-Greene Co.
*Fuller Company
Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Universal Crusher Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
*Barber-Greene Co.
*Birdsboro Steel Fdry. & Machine Co.
Brooks Equip. & Mfg. Co.
Buchanan Co., C. G.
*Gruendler Crusher & Pulverizer Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Portable Engines (See Engines —Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Portable Washing Plants
*Universal Crusher Co.

Powder, (Black, Blasting) (See Explosives)

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Power Tampers (Concrete)
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Power Units (Internal-Combustion)
Caterpillar Tractor Co.
*Chicago Pneumatic Tool Co.
Cooper-Bessemer Corp.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Precipitators
*Western Precipitation Corp.

Pre-formed Wire Rope
*American Cable Division of American Chain & Cable Co.
Broderick & Bascom Rope Co.
*Leschen & Sons Rope Co., A.

Presses (Brick and Block)
Jackson & Church Co.

Press Machines (Hand, Concrete)
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Proportioning Equipment
*Blaw-Knox Co.
Heltzel Steel Form & Iron Co.
Jackson & Church Co.
*Jaeger Machine Co.
Schaffer Poidometer Co.

Pulleys
*Birdsboro Steel Fdry. & Machine Co.
*Buchanan Co., C. G.
Sprout, Waldron & Co.

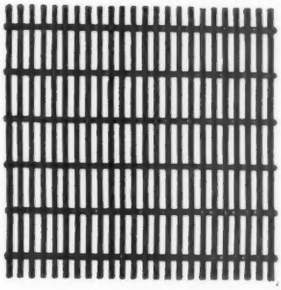
Pulleys (Magnetic)
*Sprout, Waldron & Co.

Pulleys (Wing)
*Sprout, Waldron & Co.

Pulverized Fuel Systems
Babcock & Wilcox Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.

Pulverizers (See also Crushers, Mills, etc.)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Babcock & Wilcox Co.
*Birdsboro Steel Fdry. & Machine Co.
Bradley Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Buchanan Co., C. G.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
Strong-Scott Mfg. Co.
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.



Rolled Slot

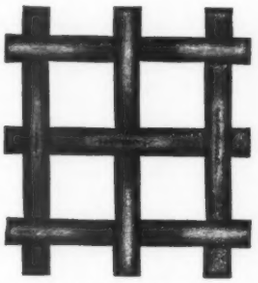
ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

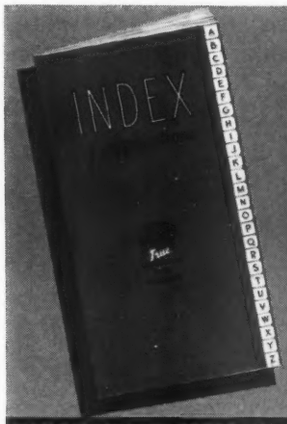
A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
574 E. 78th St. CLEVELAND, OHIO



ROL-MAN

Rol-Man Rolled, True (11% to 14%) Manganese Steel has practically double the strength and abrasion resistance of cast manganese steel, ten times the "effective strength" of mild steel and three and a half times that of heat treated nickel steel. Send for this 32 page catalog No. 3R. No obligation.

MANGANESE STEEL FORGE CO. • Castor Ave. & Allen St. • PHILADELPHIA

FOR HEAVY "OUTDOOR" DRIVES

As manufacturers of both types of flexible belt lacing, we recommend STEELGRIP for heavy drives, conveyor belts and outdoor jobs for: (1st) It can be applied anywhere—all you need is a hammer. (2nd) It compresses and protects belt ends—prevents fraying, adds to belt life. It is flexible and easily detachable. (3rd) It stands corrosion and erosion better than the lighter belt hooks.

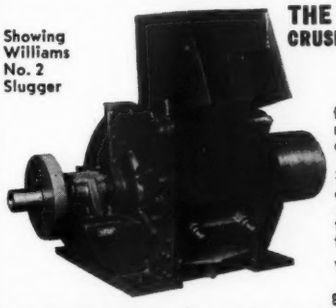
STEELGRIP comes in 8 sizes, in handy boxes of long lengths, with 2-piece hinged rocker pins that add flexibility and take the wear. It penetrates the toughest belt easily, clinches securely. Makes a permanent "humpless" joint. Write for catalog sheets and name of local distributor.

ARMSTRONG-BRAY & CO.
323 N. Loomis St., Chicago, U.S.A.

Lewistown Foundry Products
ARE
Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.
Lewistown, Pa.



Showing Williams No. 2 Slugger

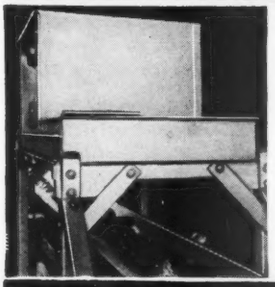
THE WILLIAMS "SLUGGER" CRUSHER *for* MAKING 1¼", ¾" OR AGSTONE HANDLES LARGE STONE

Rows of heavy, free swinging, fast revolving hammers, crush the material by impact until of proper size to pass through the gates. By reducing large rock to 1¼", ¾" or agricultural size in one operation, the "Slugger" has enabled operators to produce these sizes at a very low cost per ton and with small investment.

WILLIAMS PATENT CRUSHER AND PULVERIZER COMPANY
802 St. Louis Ave. - St. Louis, Mo.

Williams
PATENT CRUSHERS GRINDERS SHREDDERS

WEIGHING while conveying



WITH THE
MERRICK WEIGHTOMETER

Applicable to any size belt conveyor, horizontal or inclined. An accurate and dependable means of keeping constant check on production.

WRITE FOR BULLETIN 375

MERRICK SCALE M'FG. CO.
PASSAIC NEW JERSEY

NEW LEAHY
Type C No-Blind Vibrating Screen

The new Leahy is unsurpassed for fine screening. The Leahy vibration principle keeps the entire screen surface working at top efficiency, insuring increased capacity, with maintenance costs negligible. It pays large dividends on your investment. Investigate its advantages and economy.

THE ORIGINAL DEISTER CONCENTRATOR COMPANY
911 Glasgow Ave. Incorporated 1906 Ft. Wayne, Ind.
New York Office: 104 Pearl St., New York

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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*Chicago Pneumatic Tool Co.
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*Morris Machine Works
*Smidth & Co., F. L.

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Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
*Jaeger Machine Co.
Kansas City Hay Press Co.
*Morris Machine Works
Peerless Pump Division of the Food Machy. Corp.

Pumps (Dewatering)
Erie Pump & Engine Works
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Peerless Pump Division of the Food Machy. Corp.

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*Birdsboro Steel Fdry. & Machine Co.
*Buchanan Co., C. G.
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Kansas City Hay Press Co.
*Morris Machine Works

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Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Sump)
*Chicago Pneumatic Tool Co.
*Ingersoll-Rand Co.
Peerless Pump Division of the Food Machy. Corp.

Pumps (Turbine)
Erie Pump & Engine Works
*Morris Machine Works
Peerless Pump Division of the Food Machy. Corp.

Pumps (Vacuum)
*Chicago Pneumatic Tool Co.
*Fuller Company
*Ingersoll-Rand Co.

Pumps (Vertical)
Erie Pump & Engine Works
*Morris Machine Works
Peerless Pump Division of the Food Machy. Corp.

Pumps (Well)
Erie Pump & Engine Works
*Morris Machine Works
Peerless Pump Division of the Food Machy. Corp.

Racks (Curing)
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Ready-Mixed Concrete Plants
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*Jaeger Machine Co.

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*Hardinge Co.
Jackson & Church Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Traylor Engr. & Mfg. Co.

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Stulz-Sickles Co.

Rope (Manila)
Wall Rope Works, Inc.

Rope (Wire) (See Wire Rope)

Sand and Gravel Handling Equipment
*Link-Belt Co.

Sand, Lime, Brick Machinery
*Hardinge Co.
Jackson & Church Co.

Sand Separators
*Link-Belt Co.
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Simplicity Engr. Co.
Smith Engr. Works

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*Chicago Bridge & Iron Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Smith Engr. Works

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*Merrick Scale Mfg. Co.

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*Austin-Western Road Machy. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

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*Bucyrus-Erie Co.

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Carnegie-Illinois Steel Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
*Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
National Wire Cloth Co.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
Simplicity Engr. Co.
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*Sprout, Waldron & Co.
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.

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*Austin-Western Road Machy. Co.
*Barber-Greene Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Gruendler Crusher & Pulverizer Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Link-Belt Co.
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*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
Screen Equipment Co.
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*Sprout, Waldron & Co.
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*Tyler Co., W. S.
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*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

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*Smidth & Co., F. L.

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*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Sprout, Waldron & Co.

Sheets (Galvanized Iron)
American Rolling Mill Co.

Shovels (Electric, Internal-Combustion and Steam)
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
*Insley Mfg. Corp.
*Lima Locomotive Works
*Link-Belt Co.
Northwest Engr. Co.

Silos
*Chicago Bridge & Iron Co.
*Smidth & Co., F. L.

Skip Hoists and Skips
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Sleeves (Dredge)
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.

Speed Reduction Units
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Sprays
*Deister Concentrator Co.

Sprockets and Chain
*Link-Belt Co.
*Sprout, Waldron & Co.

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(See Alloys—Steel)

Steel (High Tensile)
American Rolling Mill Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Manganese Steel Forge Co.

Steel (Open Hearth)
American Rolling Mill Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp
Manganese Steel Forge Co.

Steel Grating (See Grating, Steel)

Steel Plate Construction
*Chicago Bridge & Iron Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Heltzel Steel Form & Iron Co.
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
*Sprout, Waldron & Co.

Stokers
Babcock & Wilcox Co.

Stone Grapples
Owen Bucket Co.

Storage Equipment
*Chicago Bridge & Iron Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Sauerman Bros., Inc.

Surfacers (Concrete)
*Ingersoll-Rand Co.

Sweeping Systems
Allen-Sherman-Hoff Co.

Tamp Machines (Hand, Concrete)
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.

Tanks
*Chicago Bridge & Iron Co.
Heltzel Steel Form & Iron Co.
*Hendrick Mfg. Co.
Jackson & Church Co.
*Link-Belt Co.
*Traylor Engr. & Mfg. Co.

Tanks (Elevated-Steel)
*Chicago Bridge & Iron Co.

Tanks (Sand-Settling)
*Chicago Bridge & Iron Co.
*Link-Belt Co.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

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*Nordberg Mfg. Co.

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Athey Truss Wheel Co.
*LeTourneau, Inc., R. G.

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*Gruendler Crusher & Pulverizer Co.
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*Barber-Greene Co.
*Fuller Co.
*Link-Belt Co.

Valves (Pump)
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.
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Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Vibrating Screens (See Screens—Vibrating)

Vibrators
*Tyler Co., W. S.

Vibrators (Concrete)
*Ingersoll-Rand Co.

Wagons (Dump)
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*Austin-Western Road Machy. Co.
*Insley Mfg. Corp.
*LeTourneau, Inc., R. G.

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*Eagle Iron Works
*Haiss Mfg. Co., Geo.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Smidth & Co., F. L.
Smith Engr. Works
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.

Weighing Equipment (Automatic)
*Blaw-Knox Co.
*Fuller Co.
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.
*Merrick Scale Mfg. Co.
Schaffer Poidometer Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.

CONVEYORS LAST LONGER

where SPROUT-WALDRON Wing Pulleys are used. The same is true of your Elevator belts.

Material conveyed cannot lodge between belt and pulley to cut your belts.

Interchangeable with standard pulleys.

Write for catalog

SPROUT, WALDRON & CO., INC.

1221 SHERMAN ST., MUNCY, PA.

Elevating, Conveying and Transmission Equipment

CEMENT PLANT ENGINEERING

CEMENT PLANT MACHINERY

F. L. SMIDTH & CO.

225 Broadway NEW YORK, N. Y.

SAVE • • • BY WELDING

Jaw Plates, Gyratory and Roll Crushers, Shovel Teeth, Etc.

with

MANGANAL

11 to 13½% Nickel Manganese Steel

WELDING ELECTRODES, WEDGE and APPLICATOR BARS

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STULZ-SICKLES CO. *Sole Producers* 134-142 Lafayette St., Newark, N. J.

CRUSHING EQUIPMENT

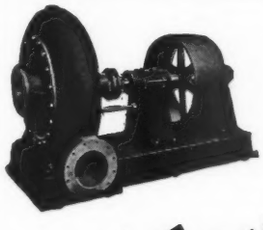
AUSTIN-WESTERN

A-W's complete line of crushing, screening and gravel washing equipment permits the selection of the equipment best suited to any requirement.

A-W Portable Units combine capacity, compactness and easy, fast portability. Built with over-size shafts and roller bearings throughout they have a world-wide reputation for low operating cost, big output and trouble-free operation at remote locations.

THE AUSTIN-WESTERN ROAD MACHINERY CO.

AURORA, ILLINOIS



Foremost for 45 years

ERIE Dredge Pumps

100% Pump Performance

achieved by the use of super-wear alloy steel and the rugged construction of every detail part. Write for Bulletin.

ERIE PUMP & ENGINE WORKS

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SINKERS — DRIFTERS

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SQUAROUND*
HEXAGON
PERFORATED
PLATE
of every description

for maximum productiveness from your vibrating screens.

*Reg. U.S.Pat. Off.

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Sales Offices in Principal Cities. Please Consult Telephone Directory

Specify AMERICAN for every crushing job

You will be sure of greater tonnage of uniform products at lower cost and long, trouble-free service. Every part is carefully selected and tested to assure maximum endurance and quality. AMERICAN Features: Manganese lined crushing chamber; cast steel adjustable platen; heavy alloy steel shaft; SKF roller bearings.

Write for complete details

AMERICAN PULVERIZER COMPANY

1289 MACKLIND AVE. ST. LOUIS, MO.

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Stulz-Sickles Co.

Welding Service
Stulz-Sickles Co.

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*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

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Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
National Wire Cloth Co.
*Robins Conveying Belt Co.
*Tyler Co., W. S.

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Broderick & Bascom Rope Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Leschen & Sons Rope Co., A.

Wire Rope Fittings
*American Cable Division of American Chain & Cable Co.
Broderick & Bascom Rope Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Leschen & Sons Rope Co., A.

Wire Rope Slings
*American Cable Division of American Chain & Cable Co.
Broderick & Bascom Rope Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Leschen & Sons Rope Co., A.

Wire (Welding)
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Manganese Steel Forge Co.

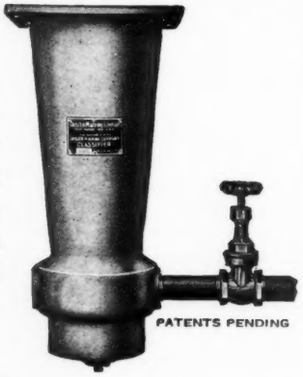
Worm Gears (See Gears and Pinions)

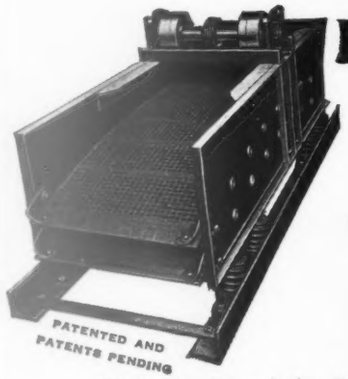
* See also information in the 1938 Pit and Quarry HANDBOOK.

COMPOUND FUNNEL CLASSIFIER

For sizing minus 5/16" gravel and sand, and for cleaning it by washing out silt and other light impurities.

Descriptive Bulletin No. 23





PLAT-O

Improved Heavy Duty

VIBRATING SCREEN

Built in all standard sizes—in from one to three decks.

Write for Descriptive Bulletin No. 26

DEISTER MACHINE COMPANY

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THERE MUST BE A REASON

FOR

CONTINUED POPULARITY

For nearly nine years Pit and Quarry has led all other papers in this field in subscriptions among producers. It is the most popular paper—with its popularity constantly growing, as is shown by the increasing number of subscriptions and the increasing margin of lead.

The reason? At no time has Pit and Quarry compromised with its high editorial standards. It has held its editorial staff, and kept its field editor on the road, wearing out a car in one to two years. The illustrations have always been plentiful, the articles easy to read.

Costly to do this? Yes, it is. But it has been worth the cost, for producers realize that Pit and Quarry has worked *with* them. Savings effected by change from biweekly to monthly publication have been passed on in the form of a reduced subscription price—not pocketed. And the high percentage of subscribers who renew their subscription attests their loyalty to a publication understanding their problems and working *with* them.

The subscription price is still only one dollar for a full year's service. If you are not already a subscriber, why not send in a dollar and learn why other producers find Pit and Quarry so valuable? The cost is so small—the results so large—don't delay.

Return This Coupon To-day—Start Your Subscription with the September Issue.

PIT AND QUARRY PUBLICATIONS,

538 So. Clark Street, Chicago, Illinois.

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Company Name .....

Send to (Address).....

We Produce .....

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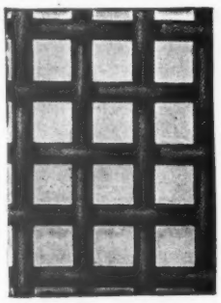
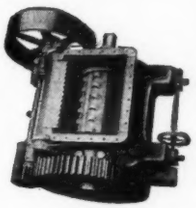
of Nat-aloy Wire Cloth



- ★ Wears five to ten times as long as cloth made of ordinary steel
- ★ Withstands vibration without crystallization
- ★ Super-tough to resist abrasion
- ★ Maintains accuracy throughout life of screen
- ★ Economical in price and serviceability

Attractive Prices
Immediate Shipments from Stock

NATIONAL WIRE CLOTH CO., INC.
St. Paul, Minn. Write for new catalog No. 36.



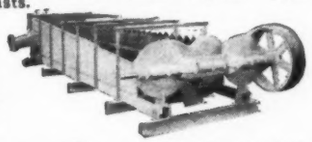
McLANAHAN EQUIPMENT

CRUSHERS

Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

SCREENS

Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.



McLanahan & Stone Corp. *Established 1835* HOLLIDAYSBURG, PENNSYLVANIA

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12 Sizes
3/8 to 1¼ Yard
Also truck mounted shovels and cranes

The many exclusive and time tested developments in BAY CITY equipment have made them real *yardage producers* which means lower excavating costs.

Write for new "COMPARE" booklet.

BAY CITY SHOVELS, Inc., Bay City, Mich.

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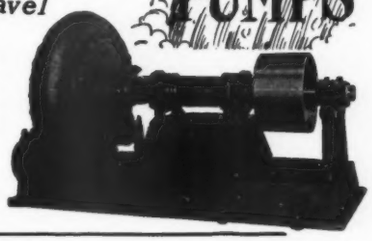
Heavy-Duty (Ball-Bearing) Sand and Gravel



High efficiency — low operating cost—precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE

KANSAS CITY HAY PRESS CO.
KANSAS CITY, . . . MO.

PIT AND QUARRY

Research Department
538 South Clark St., Chicago, Ill.

Please send me catalogs and prices concerning the following items checked below:

- ☐ Agitators, sand and Gravel
- ☐ Agitators, Slurry
- ☐ Aggregate — Bituminizing Plants
- ☐ Air cleaners
- ☐ Air compressors
- ☐ Asphalt Mixing Plants
- ☐ Asphalt Mixers
- ☐ Bag fillings nd weighing machinery
- ☐ Bags, cloth
- ☐ Bags, paper
- ☐ Balls, steel
- ☐ Barges, steel
- ☐ Belt Dressing
- ☐ Belt fasteners
- ☐ Belting, conveyor and elevator
- ☐ Belting, transmission
- ☐ Belt lacing
- ☐ Belt plates
- ☐ Belt rivets
- ☐ Belt tighteners
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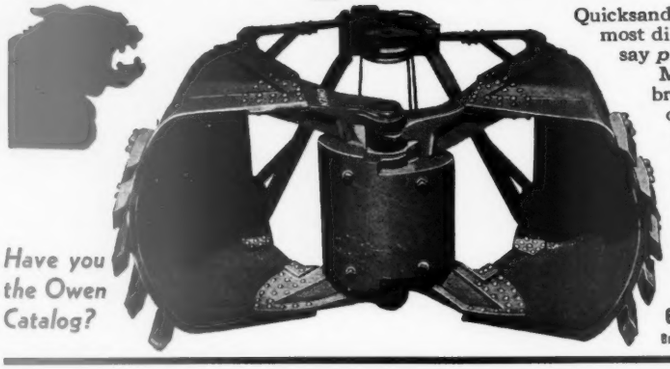

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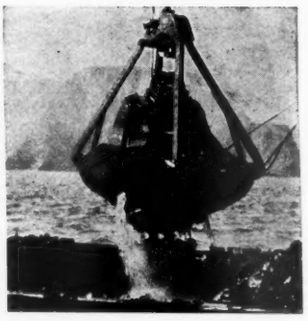

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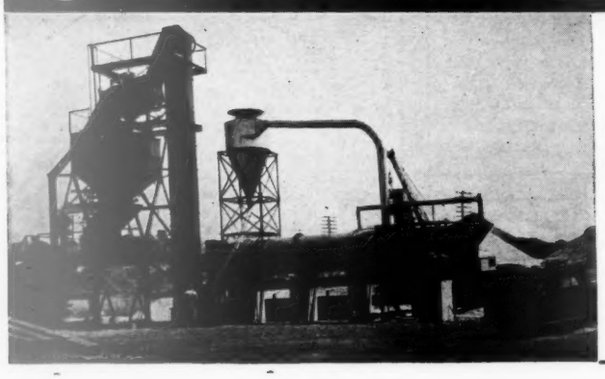

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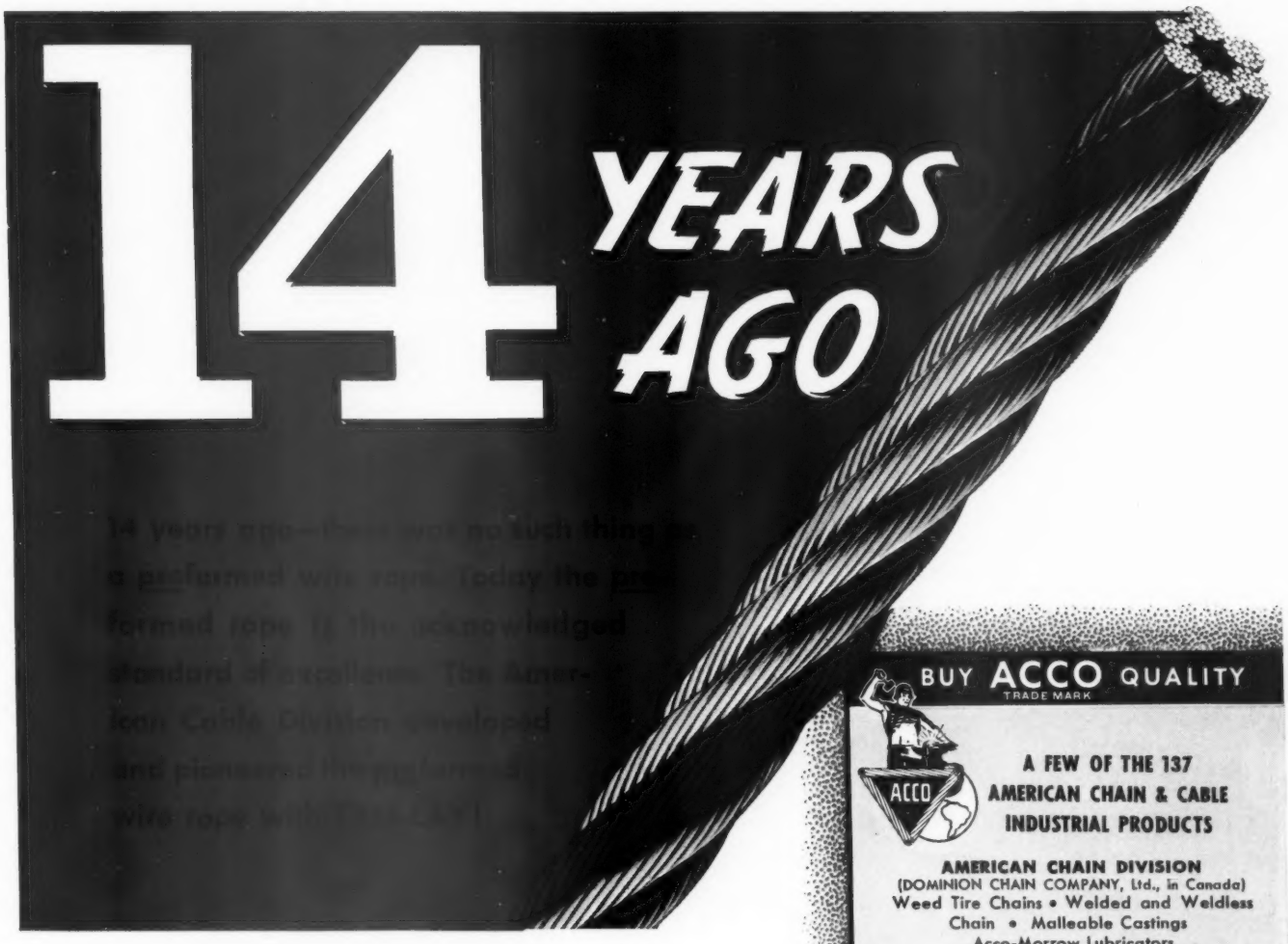

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